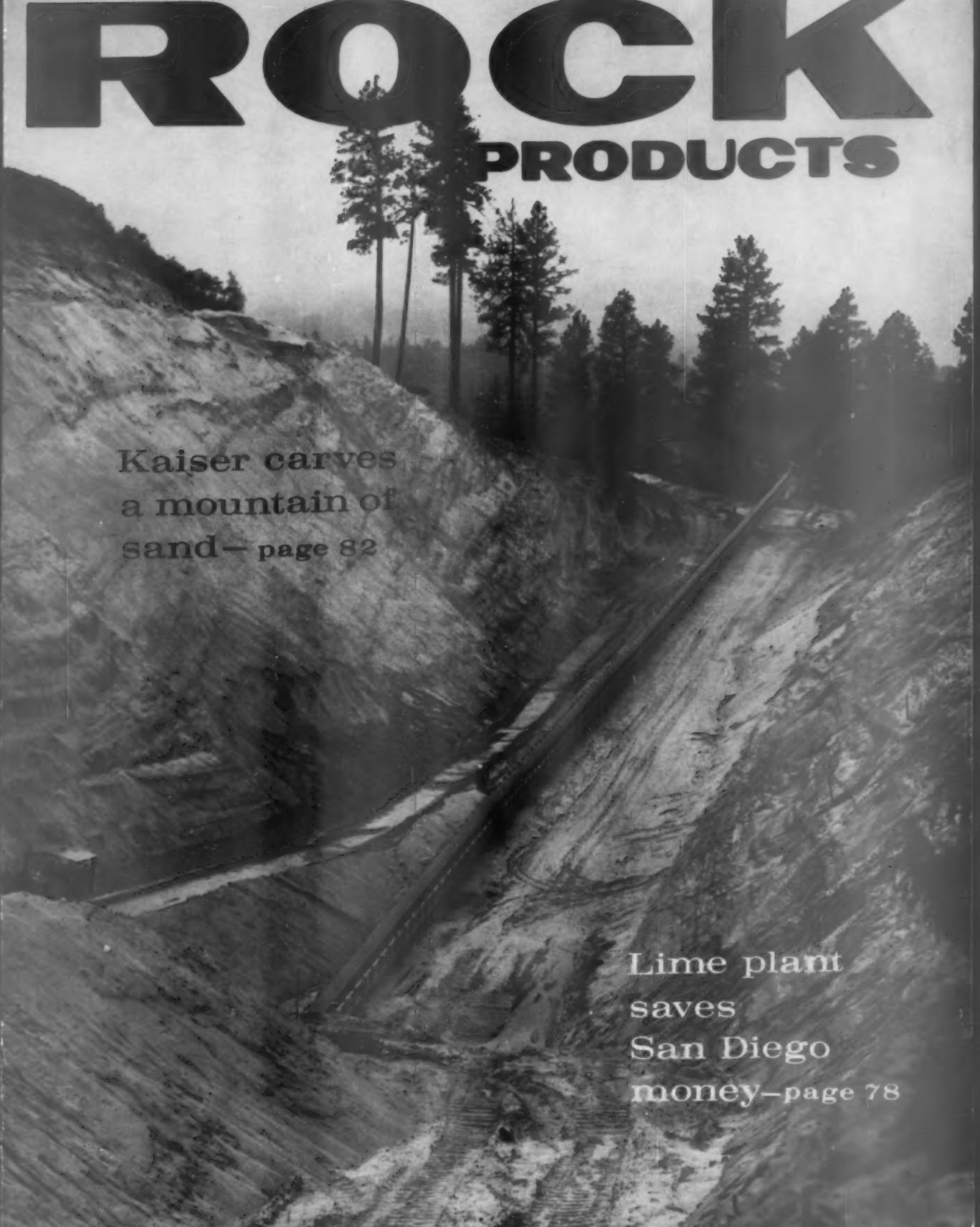


AUGUST 1961

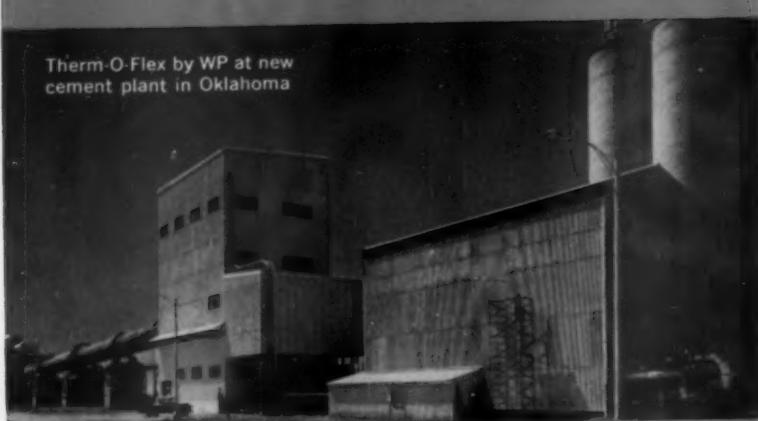
ROCK PRODUCTS



Kaiser carves
a mountain of
sand—page 82

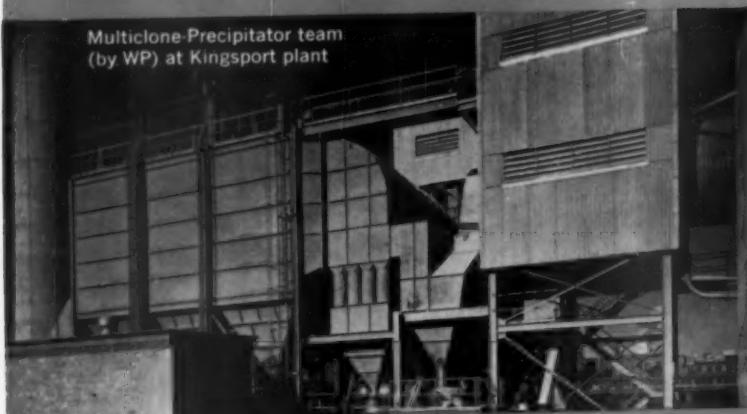
Lime plant
saves
San Diego
money—page 78

Therm-O-Flex by WP at new cement plant in Oklahoma



**Cement makers in Tulsa...
and in Tennessee...agree:**

Multiclon-Precipitator team
(by WP) at Kingsport plant



**When DUST is your problem—
CLEAR IT WITH WP***

For an efficient, economical solution to any dust control problem—look to Western Precipitation. WP is uniquely fitted to handle your unique problem—being the one organization that custom designs, engineers and installs ALL types of dust and fume control equipment: Precipitator, Mechanical, Jet-Cleaned Filter, Hi-Temp Filter, Scrubbers and engineered combinations.

With no axes to grind for any one system, WP engineers will give your job a completely unbiased recommendation—whether it's a quote on your specifications, a single component, or a completely engineered installation...small, major, simple, or complex.

An inquiry—on your business letterhead—will bring you literature promptly. Just write Western Precipitation, 1000 W. 9th St., Los Angeles 54, Calif. (In Canada, write 8285 Mountain Sights Ave., Montreal, P.Q.)

Dust and fume control since 1907

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PRECIPITATION**

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ELECTROSTATIC Precipitators

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DUALAIRE Jet-Cleaned Filters

THERM-O-FLEX Hi Temp Filters

TURBULAIRE Scrubbers

JOY-MICRODYNE Scrubbers

also MOLO-FLITE Processors

HI-TURBIANT Heaters

TURBULEX Processors

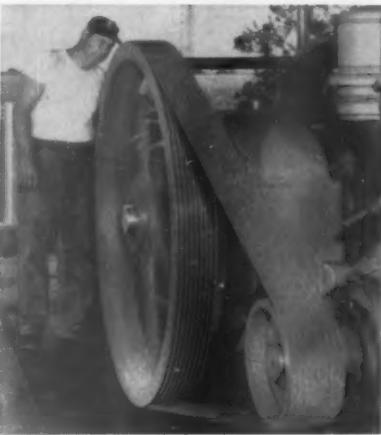
B.F.Goodrich

V belt briefs

TIPS ON THE CARE, MAINTENANCE AND SELECTION OF V BELTS FOR INDUSTRY



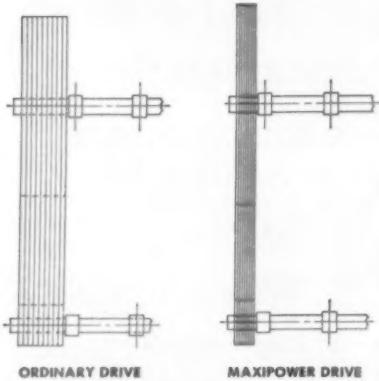
ORDINARY V BELT DRIVE



MADIPOWER DRIVE

SAVE \$402.14 ON V BELT DRIVES—Costs for both sheaves and V belts were cut when B.F. Goodrich Maxipower belts replaced ordinary belts on this drive. Size and weight of sheaves were reduced, smaller and fewer V belts were used—eight 5V2500 belts replaced nine D-240 belts. The result: a \$402.14 saving. Costs can be cut as much as 30% by switching to a Maxipower V belt drive.

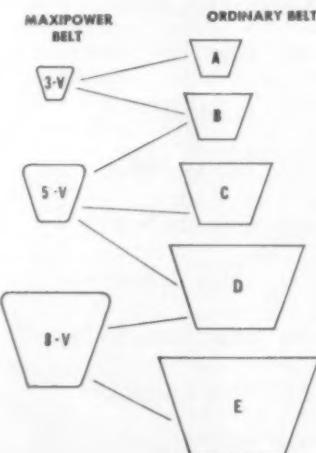
How Maxipower V belts reduced bearing load 42%



In the installation shown above, sheaves for the Maxipower drive are lighter, have a face width of only $5\frac{1}{16}$ ", compared to a $13\frac{1}{4}$ " width for the sheaves on the ordinary drive. Because there's less weight, less shaft overhang, bearing load for this Maxipower drive is 42% less for the driven shaft shown than the drive replaced. This greatly increases bearing life.

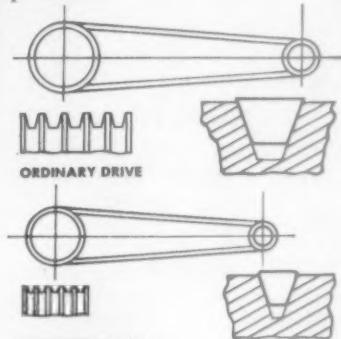
With Maxipower V belts, three cross sections do the work of five

Each cross section of the new B.F. Goodrich Maxipower V belts has been fitted to a particular horsepower range so that only three cross sections are needed instead of the A, B, C, D, and E sections of conventional V belts. The three cross sections are 3V, 5V and 8V.



New BFG Maxipower V belts save space, weight, bearings, dollars

New B.F. Goodrich Maxipower V belts give up to three times the horsepower-carrying capacity in the same amount of space as ordinary belts. This more compact drive gives you more horsepower per dollar, results in substantial savings, both in initial costs and often in belt replacement.



ORDINARY DRIVE

MADIPOWER DRIVE

In most Maxipower installations, fewer belts and smaller diameter sheaves are used, center distances are shorter. Costs can be cut up to 30%, valuable space is saved. Sheaves have narrower grooves and groove spacing, are smaller, less costly. The smallest sheaves that can safely be used with the drive motor can be installed. Often these will be 50% smaller than present drives. This reduced sheave weight and face width means less shaft overhang, less bearing load—increased bearing life.

The extra strength of Maxipower V belts comes from its new rubber compounds, the tough fibers used in its load-carrying cords, and the new "deep V" design. Because of this design the belt's load-carrying cords are supported so completely that each has an equal share in the load—none "loaf".

All Maxipower V belts are heat-resisting, oil-resisting at no extra cost. Belts with static conducting properties can also be ordered at no extra cost.

For further information and help in selecting Maxipower belts for your drives, call your B.F. Goodrich distributor. B.F. Goodrich Industrial Products Company, Dept. M-113, Akron 18, Ohio.

B.F.Goodrich v belts

Enter 1033 on Reader Card

ROCK PRODUCTS, August, 1961

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August 1961

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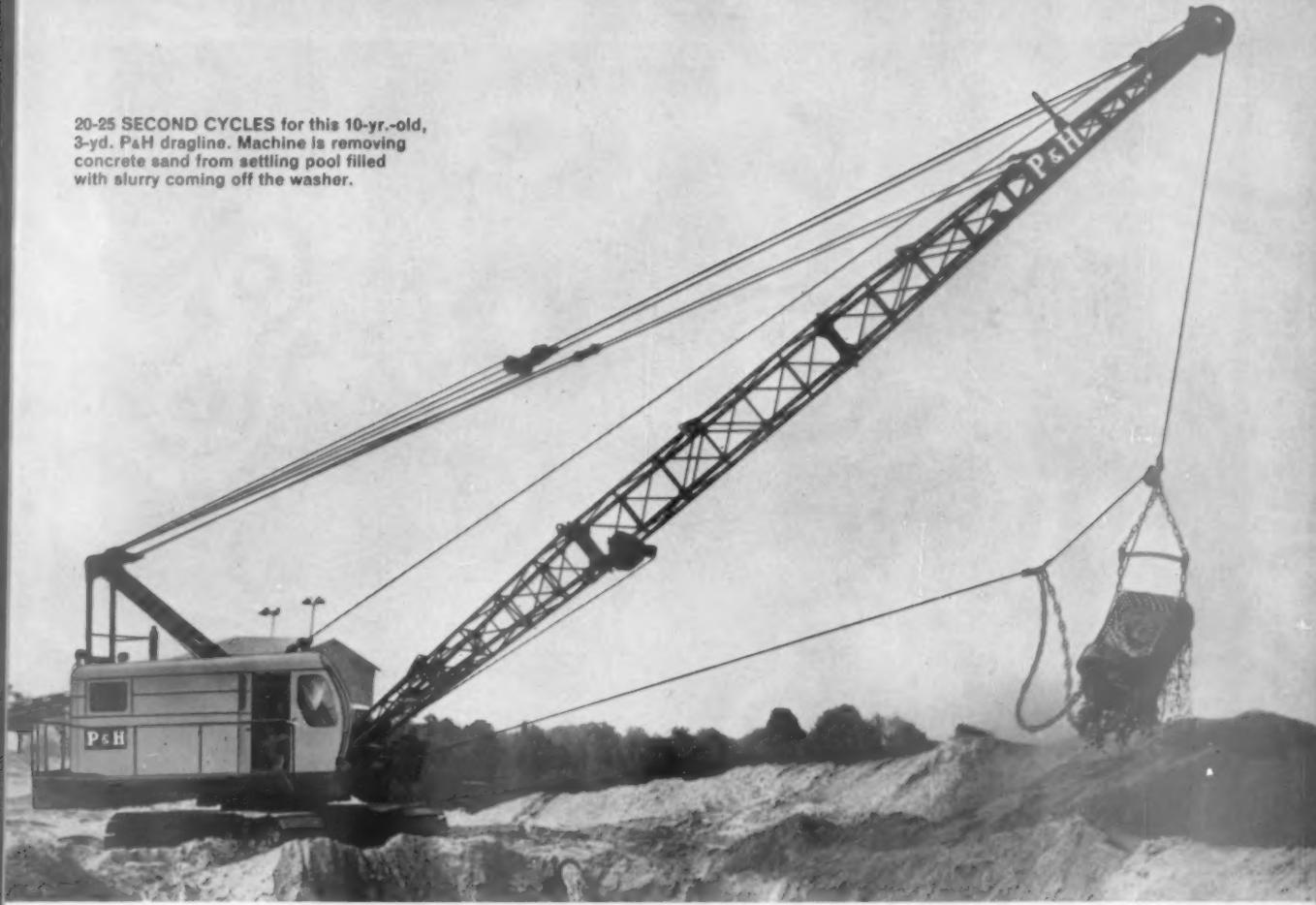
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20-25 SECOND CYCLES for this 10-yr.-old, 3-yd. P&H dragline. Machine is removing concrete sand from settling pool filled with slurry coming off the washer.



"now in tenth year, Magnetorque equipped P&H 955A dragline is still the biggest producer around"

...REPORTS COMMONWEALTH SAND & GRAVEL CORP., RICHMOND, VA.

"In Spring of '52, we bought one of the first 3-yd P&H 955A Draglines equipped with Magnetorque Swingers. In '55 we bought two more," says John Twohy, II President. "We had rigs with friction swings and compressed air swings. They couldn't compare with our P&H draglines." Proof again that one P&H always sells another.

3000 TONS DAILY OUTPUT for two 3-yd. P&H draglines digging in gravel pit. These machines work from 30-ft. high bank, dig 10 to 12 ft. below water surface.



"We believe Magnetorque Swingers will practically double the life of our machines". . . says Twohy. "Magnetorque Swingers have made our P&H draglines exceptionally fast and dependable . . . eliminated the need for constant adjustment and downtime for lining replacements. What's more," he points out, "Magnetorque Swingers minimize wear and tear on the crawlers because their smooth, jerkless swings reduce the walking effect you'd ordinarily get on a setup like ours."

Heavy-Duty P&H Booms pay off . . . "P&H design engineers understand that people in our type of dragline work need a heavy-duty boom—and they've provided it," continues Twohy. "Ordinary booms just don't stand up."

To see how P&H machines can pay off for you, contact your P&H dealer. He'll be pleased to arrange for a demonstration at your convenience. For more details on this job, ask him for Case History No. 151 or write us.

HARNISCHFEGER **P&H**
Milwaukee 46, Wisconsin



90 to 120 Tons Per Hour

Material Passing a 1" Screen (based on 25% oversize)

- Low hopper height for loading from $\frac{1}{2}$ or $\frac{3}{4}$ cu. yd. shovel, or with front end loader.
- Heavy duty grizzly with openings that give higher crush production with minimum scalping.
- Adjustable single eccentric plate feeder, clutch-operated.
- Operator's platform permits view of entire plant, controls centrally located.
- Can be equipped with sand rejector.

Diamond makes everything for the aggregate producer:

Jaw Crushers • Roll Crushers • Conveyors • Screens and Washers • Feeders and Bins • Portable and Stationary Crushing Plants for Rock and Gravel.

Enter 1010 on Reader Card

4

High production *when you want it . . . where you want it*. That's the big feature of the new Diamond 1536 single-pass portable crushing plant. It can be readied in minutes for moving down the road or across the county and quickly set-up for more economical production. It's designed for counties, townships and contractors where tons produced must be high and mobility is a must.

You get dependable performance, and low operating cost from this rugged, compact plant equipped with a two-cubic-yard capacity loading hopper. The 24' x 3' 1½" plate feeder, 15" x 36" jaw

crusher, 3' x 5' 1½ deck vibrating screen and 30' x 19'6" delivery conveyor are mounted on a steel channel, gooseneck truck frame. It also carries the necessary drives, walkways, and ladders as well as optional equipment, including power unit, fuel tank, batteries, battery box and cables.

Delivery conveyor is hinged thus eliminating any dismantling for towing. The short wheel base and towing bar provide excellent maneuverability on road or in pit.

One way to be sure of getting the full story on the new Diamond 1536 is to see your Diamond distributor.

DIAMOND IRON WORKS
DIVISION
GOODMAN MANUFACTURING COMPANY
Halsted Street and 48th Place • Chicago 9, Illinois



ROCK PRODUCTS, August, 1961

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CEMENT

PRODUCERS

**KNOW
what a REAL
ROCK SHOVEL is!**

Oklahoma Cement Co.,
Pryor, Okla.



Monarch Cement Co.,
Humboldt, Kas.

BIG PERFORMANCE... LOW MAINTENANCE WITH PINNED-DOWN STABILITY

Allis-Chalmers tractor loaders feature axles that are pin-connected to the frame with thick steel pins . . . not automotive-type U-bolt connections. Tractor loaders stay on the job . . . not in the shop.



Pinned-down stability—that's what you get in Allis-Chalmers tractor loaders. Axles on these units are pin-connected to the frame with thick steel pins . . . not lightweight U-bolt connections. There's no rolling or shifting under load . . . no grief with bolts working loose . . . or mounting plates warping out of shape.

Pin-connected axles keep Allis-Chalmers loaders on the job . . . not in the shop. There's far less downtime due to annoying axle problems. You'll also profit from: *extra stability* from a longer wheelbase to length ratio; *single-lever control* of all speed and direction movements; *five-way hydraulic filtering* for safe, efficient operation; *well-located dump cylinders* that are up and away from dirt and *high lift—long reach* for fast, easy loading cycles.

See Allis-Chalmers loaders in action. Be convinced that these units can bring you extra earnings on all excavating and loading work. *Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.*

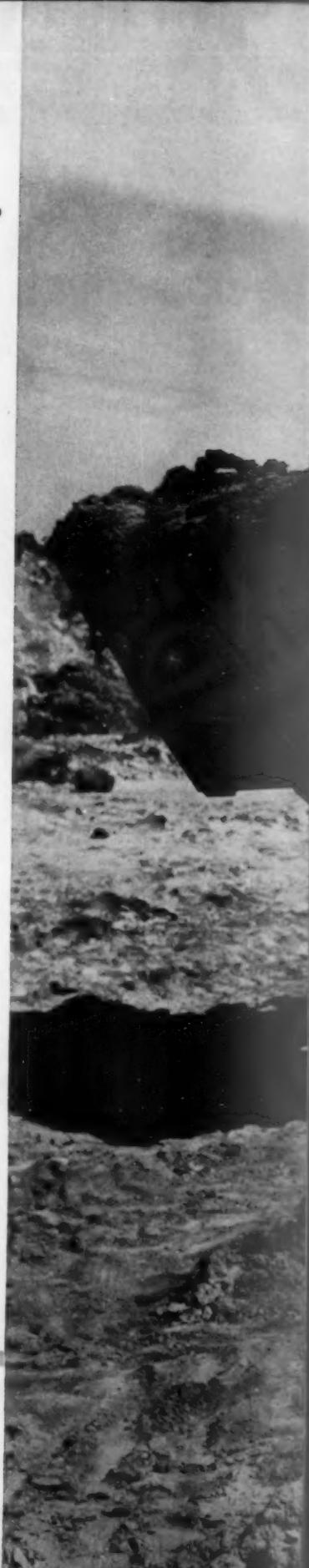
Allis-Chalmers offers 6 tractor loader models—ranging in power from 76.5 to 184 horsepower—in carry capacity from 3,600 to 10,500 lb and with buckets available from 1 to 6 cu yd.

STEP UP YOUR

Performance
Operator comfort
Wearability
Ease of maintenance
Reliability



WITH **ALLIS-CHALMERS**
POWER FOR A GROWING WORLD







"OUR EXPERIENCE PROVED

only a Magnetorque - equipped

DEWEY PORTLAND CEMENT CO., DIV. OF AMERICAN MARIETTA, reports on 5-yd. P&H electric shovel purchased for their new, fully automated multi-million dollar cement plant near Tulsa

Norman D. Armentrout—supervisor for the quarry at Tulsa as well as other company operations at Dewey, Oklahoma and Davenport, Iowa—says, "Based on experience with P&H electrics, our decision to buy the P&H 1500 was almost automatic."

Here's how the P&H is justifying that decision.

Easily Loads 550 To 600 Yds. Hourly

In the Tulsa quarry, Mr. Armentrout con-

tinues, "The Magnetorque equipped P&H breezes through a dig-swing-dump cycle in just 27 seconds. In an hour, it averages over 550 yds. And with each yard weighing about 2,400 lbs., the P&H electric will easily be able to supply the 5000 tons we'll need daily when the plant is operating at full capacity. But even now, with the plant scheduled at 2,000 tons daily, the P&H is a money-making machine."

**AS THE
DIGGING GETS
TOUGHER**

Magnetorque Hoist Drive automatically provides higher bail pull for faster acceleration of the dipper through the bank.

**FOR
FAST, SMOOTH
SWINGS,**

exclusive P&H *Static* Electronic Control, a feature on every P&H Electric Shovel since 1947, results in smooth, stepless acceleration and deceleration to and from maximum swing speed . . . faster work cycles.

**FOR QUICK,
PRECISION
LOADING,**

P&H *Static* Electronic Control is instantly responsive . . . insures accurate load spotting . . . reduces spill, chance of hauler damage and slashes cycle time still further.



P&H electric would do"

Magnetorque Makes The Big Difference

The Magnetorque hoist drive provides exceptional power at the speeds you can effectively use to speed the dipper through the bank. "Magnetorque with electronic control," says Armentrout, "makes the P&H 1500 the fastest cycling shovel I've ever seen in its size range. It's the most productive electric on the market—regardless of make or size."

Day-In, Day-Out Dependability

"P&H electrics just don't stop working unless you stop them," adds Armentrout. "For in-

stance, the 4½-yd. P&H electric we have at Davenport, Iowa, dug nine-million tons of stone before we even had to replace a pinion."

This report—one of many—provides further evidence why—**ONE P&H SELLS ANOTHER!**

Before you buy an electric shovel . . . compare all performance factors. For complete details on this operation, write for Case History Report No. 146 to the World's Largest Builder of Full-Electric Shovels.

HARNISCHFEGER **P&H**
Milwaukee 46, Wisconsin



Special report to users of Caterpillar equipment



Parts you can trust
...cost less per hour

New Cat parts stretch dollars “down where the digging’s going on”

That's more than just talk! More and more users are conducting their own field trials of ground engaging tools—tips, bits, teeth and edges—to determine which brand gives them the best performance-cost balance. And time after time, they find that genuine Caterpillar ground engaging tools outclass

all comers—in production and over-all economy!

Take Cat cutting edges. These edges have been contractor-tested with most of the market's leading brands all over the country. Results: Cat edge wear life—10-60% longer. Cat edge cost—15-50% less per hour. Think of that in terms of dollars!

HERE'S A LOOK AT RECENT FIELD TRIALS ON SCRAPER CUTTING EDGES:

Two DW21-470 Scrapers, one with Cat *standard* edges and one with popular brand *thick* edges, were put to work “side-by-side” by a contractor in hard, red clay on an Interstate Highway job. His findings:

Brand	Price	Hours of Life	Cost per Hour
Other	\$121.22	1060	\$.114
Cat	\$128.28*	1360	\$.094

HIS SAVINGS WITH CAT EDGES—17.5% PER OPERATING HOUR

*Test completed before recent new low price of \$102.30 effective.



CATERPILLAR



OTHER BRAND

A Cat $\frac{7}{8}$ " stinger and another brand *one inch thick* were split in half and a section from each installed on *same* DW21-470 Scraper working in decomposed lava with embedded basaltic boulders. Other brand section broke after 48 operating hours, was reversed but broke again two hours later—a total of 50 hours of life. *Cat edge wear during period was $\frac{1}{4}$ ", other brand $\frac{1}{2}$ ".*

Your Caterpillar Dealer has the facts on many of these tests—go over them with him and start to save more now.

Caterpillar continually up-dates its line of ground engaging tools. Some of the newcomers to the line that “stretch your dollars” are: new self-sharpening end bits and ripper tips, patented reversible router bits, and new-design scarifier teeth for Motor Graders. These new money-savers keep production high, costs down.

Caterpillar Tractor Co., General Offices, Peoria, Illinois, U. S. A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

WHAT'S HAPPENING

in other fields of interest to the rock products industry

From the 2,000-mph. B70 bomber to the daintiest costume jewelry, manufacturing costs may well be sliced by a unique material composed of common sand. Glasrock, developed by John W. North with assistance from the ceramics branch of Georgia Tech, is the result of the first economical method of fusing silica for use in high-temperature molding. Sand containing at least 99 percent silica is fused into large chunks in a 3,800-deg. electric arc furnace. Then it is finely pulverized, put into plaster casts—with or without a foaming agent—and set, dried and fired. Because it can withstand sudden temperature changes and does not conduct heat or expand with it, Glasrock molds can process the hottest iron and steel. In experimental foundry use, it has been discovered that over 100 castings can be made from one Glasrock mold, where conventional molds deteriorated after a single use!

Rock loses out to plastic in a newly developed system for filtering organic-containing waste. Mead Corp., Dayton, Ohio, has been experimenting with a grid of polyvinyl chloride installed in a trickling filter plant at Rome Kraft, Rome, Ga. The system has proven strong and porous; lighter in weight than conventional rock or slag filters, it has about twice the surface area and can remove up to 10 times the organic material. Construction costs are lower too, and the effluent can usually be run through the filter without an expensive cooling system.

The Manitoba Bog has been conquered by roadbuilders reconstructing the No. 10 highway between Mafeking and The Pas, Manitoba. This 14-mile muskeg, most of it below the water table, was previously traversed by a log-based floating road. Replacement work was done in winter, with 1.3 million cu. yd. of soggy peat removed by draglines and the trench backfilled with clay excavated from ridges marking the edges of the one-time lake. The freezing temperatures held back the water. At completion, the new road surface will be 7 ft. above bog level.

Ultrasonics is penetrating the mining industry, cutting costs as much as 40 percent in the flotation process of ore extraction. A Yugoslav-born engineer in the Quebec Dept. of Mines, Henry V. Zaruba, has developed an ultrasonic vibrator. Compressed air drives a water jet against a sharp blade, vibrating it at frequencies as high as 45,000 cycles per sec. In the flotation process, where ore clings to oil particles as the crushed rock is passed through emulsion, the ultrasonic vibrations reduce the oil globules to less than one micron. This means that much less oil is used, and with far greater efficiency.

Please turn page

What's Happening

continued . . .

Montana limestone producers will be in on the "killing" when an unusually engineered, 350,000-tpy. steel mill gets into production at Anaconda, Mont. Designed by Webb & Knapp Strategic, using the Strategic-Udy reduction process, the plant will consume as raw material the 40 million tons of copper slag that have been accumulating at the Anaconda Co. site. Chemical & Engineering News (Dec. 12, 1960, p. 32) claims that in this reduction process two tons of limestone are needed for each ton of steel produced. The conventional blast furnace is replaced by a rotary kiln and electric furnaces, allowing materials to be added at different process stages for greater control. Carbon can be added to the limestone at any time while the calcining is taking place inside the rotary kiln.

Now rock products producers can take to space—at least in their imaginations. Scientists at the Air Force Cambridge Research Laboratories assert that the earth is wrapped in an aerosol layer which is about 85 percent sulfur, 15 percent varying amounts of silicon, iron and aluminum. They believe that ozone or sunlight acts chemically on hydrogen sulfide or sulfur dioxide, creating the three-mile-thick "blanket" about 11 miles above the earth.

Fifteen years of research at a cost of some \$2 million bore strange and potentially valuable fruit for E. I. du Pont de Nemours & Co. It is Baymal, alumina synthetically reduced to microscopic fiberlike particles far smaller than any mechanical grinding process could ever produce. Although no definite commercial use has been set, the possibilities and versatility of Baymal seem almost unlimited. For one thing, it forms a stable colloid with water and when evaporated on a surface forms a film that can be bonded to it by baking. When used on firebrick, it is claimed to raise heat resistance by 300 deg. C. Another high-potential field is the cosmetics industry: Baymal, which is wettable by either water or oil, makes a fine emulsion agent. Too, it has the unusual property of turning into either gel or liquid, according to whether it is let stand or shaken. Still a third wide area of use is as sprayed or brushed inorganic adhesive coatings. Because Baymal particles are positively charged, they are strongly attracted to negatively charged surfaces such as glass, paper and synthetic fabrics, thus having great promise for both the textile and printing industries among others. And one of the most intriguing possibilities is that these tiny aluminum "atoms" are so dense and hard that as cutting tools they may rival diamonds.

Igloos that never melt—even in the tropics—are now being marketed by Filtered Resin Products Co., a subsidiary of Monsanto Chemical Co. Though the Eskimos are probably too nomadic to care about replacing snow with foam plastic, these 22-ft. diam. Geospace units should find wide use as weatherproof emergency housing, equipment or bulk material storage, jobsite warehousing and in various military capacities. Three men can assemble one of the "igloos" in 8 hours by cementing together triangular panels made of $\frac{1}{2}$ -in. rigid resin foam between layers of 69-lb. kraft paper dip-coated with alkyd-based, weather-resistant paint. Weight of the package? Only 350 lb.



Q: What do Goodyear Earthmover Rims have that no others have?

A: MORE times FOUR

1. MORE rims on the job:

More tons are hauled on—more earth-moving equipment rides on Goodyear rims than on any other kind. Result: You reap the benefits of the widest, soundest experience in rim design, manufacture and use.

2. MORE kinds of rims:

Maximum rim performance stems from proper specification. Goodyear makes the *only complete line* of earthmover rims. Result: The choice that permits you to get exactly the right rim for the job.

What better reasons for choosing Goodyear as your rim supplier? Only these: The desire and ability to design and build any rim that may be needed for *tomorrow's* earth-moving equipment. No matter what your rim needs or plans, you'll find it pays to call on Goodyear. See your local rim distributor, or write: Goodyear, Metal Products Division, Akron 16, Ohio.

3. MORE rim engineering help:

Goodyear has more engineers designing *and selling* rims than any other company. And they know tires, too. Result: The help you need in choosing the right rim for top performance—longer tire life.

4. MORE rim "firsts":

The first *true* earthmover rim, the first 5° rim, the first tubeless rim—in fact, every major earthmover rim advance was made by Goodyear. Result: The very latest in rim design and manufacture at work, for you.



Lots of good things come from

GOOD YEAR

EDITORIAL

by George C. Lindsay

How to cure an ulcer

AN UGLY SCAR ON OUR REPUTATION as a nation, a people and a business is the undeniable fact that our management-labor relationships are miserable, for the most part. Try as we have to correct it, there's still a general nationwide feeling that neither "management" nor "labor" trusts the other.

In the name of all that's decent, humanitarian, philosophical and economically practical, why have we as a people condoned the growth of this national ulcer?

Our libraries are chock full of volumes that are devoted to billions of words setting forth the positions of both sides in millions of cases in dispute. Since World War II, our Congress has passed two major and we don't know how many minor bills that were supposed to have set high standards.

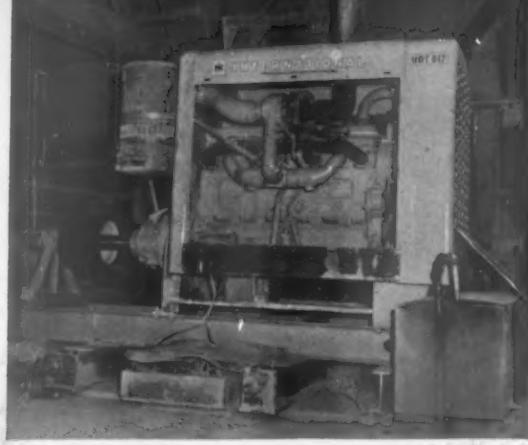
Now, 66,000 strikes later, with losses of billions in wages and profits, we still face what we hope is not an unsolvable problem. It was put ably by "Rocky" Rockwood in our January 1960 issue: "How much voice or influence is organized labor entitled to in the management of an industry or any individual enterprise in an industry; or is it entitled to any say?" We'd like to add one point. Should we limit the question to organized labor, since that class represents less than 25 percent of our total civilian labor force? We have, we think, because union leaders spend full time in peddling influence as to their position.

As always, though, we are encouraged by some bright lights on an otherwise dark picture. One company and union we know have done a creditable job by simply deciding to "do something." They make every effort to settle grievances on the spot as fast as they arise, reducing written grievances to a minimum. Result after nine months of effort: unsettled grievances totalled 9, compared to as many as 12,000 formerly. Makes good sense, doesn't it?

Here's another interesting report. A State Congressman found by surveying factory workers in his district that 80 percent believed unions should be subject to anti-trust laws. Sixty percent voted "No" on legalizing construction boycotts. If factory workers—mainly union workers, we assume—believe this, they're certainly in accord with management's thinking. Since public opinion is always in advance of the law, it would seem clear what action legislators should take, if this is a good sample.

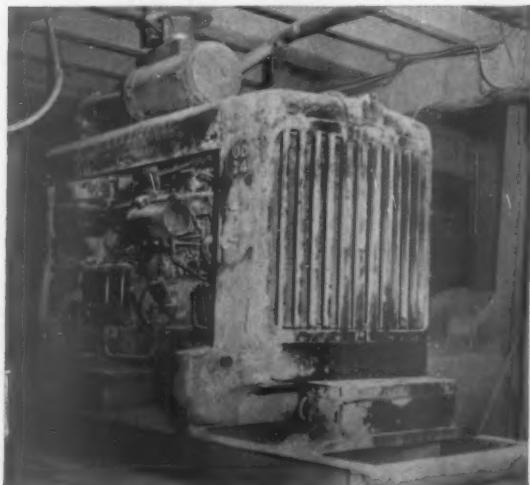
It takes two signatures to make a contract. Before signing future ones, we fervently hope that both business and labor representatives can be philosophical enough to agree not to disagree, in the best interests of the company or industry, the laborer and the public.

That's the only medicine that will cure the ulcer.



New 375-hp UDT-817 diesel replaced an old International UD-24 when the company stepped up production. "This new 817 gives us plenty of power with an abundant surplus," says Plant Superintendent J. M. Houtz. "It starts easy, has good fuel economy, and carries a constant load with normal temperature."

Durable dust-covered veteran is still in good shape after years of continuous service. "We've been using International engines since 1941," says Mr. Houtz. "We get dependable power with minimum repairs in extremely dusty conditions!"



20 YEARS of dependable power from dust defying International diesels!

The Kentucky-Virginia Stone Co., a leading producer of aggregate and crushed limestone products, solves the dust problem with a simple formula: *Buy International because IH engines are designed to cope with dust!*

Some engines virtually choke to death when abrasive grit reaches internal parts. But International diesels, with 99%-plus air-filtering efficiency, live on clean air, keep dust and grit outside. That's why so many IH diesel owners get long-life, low-repair engine performance on dusty crushing jobs. If your plant "smokes" and covers equipment with abrasive powder, it will pay you to investigate clean-breathing, perfectly sealed International engines!

There are 35 diesel and carbureted models in the IH line, from 16.8 to 385 max. hp, stripped engines to complete power units. Your nearby International Engine Distributor or Dealer will be glad to give you full product information, and installation assistance when you need it. Call him soon!

INTERNATIONAL®
H ENGINES

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Ill.
A COMPLETE POWER PACKAGE



TD-25 outproduces '24' New Power advantages high-walling—*for Morris Enterprises,*



by 20%... speed

Owensboro, Ky.



"The new International TD-25 is giving us about 20% more production than our TD-24," states Paul H. Morris, owner of Morris Enterprises, Owensboro, Kentucky. "The '25's' DT-817 turbocharged Diesel is snappy, doesn't lug down, and has the power to carry full loads without hesitation."

"I particularly like my '25's' Planet Power steering and Hi-Lo power-shifting advantages for high-wall cutting—and the good balance, which enables backing up steep grades and starting the push immediately."

"My TD-24 has clocked better than 10,000 production hours in four years, with outstanding service and very low downtime."

Full-cut benching—full time

Apply full power to the job—maintain full speed—keep the blade loaded full time—benching or highwalling with the International TD-25. You simply operate the bankside track in high speed range, the other in low speed range—for full-capacity straight ahead performance, without "fish-tailing" or "banknosing."

You make full-load, full-power turns with TD-25 "live-track" Planet Power steering. And with combined Hi-Lo power shifting, you get instant up-or-down matching of power to condition. You eliminate "dead-track drag" and "gear-shift" lag—and benefit accordingly.

See how the 230-hp TD-25 outproduces king-sized clutch-steered rigs by up to 50%, or more—clearing land, removing overburden, highwalling, and benching. Compare DT-817 turbocharged Diesel wallop—measure how dual-valving insures "free breathing" for clean combustion and big work capacity at all altitudes. Let your International Construction Equipment Distributor demonstrate.

"Slugging" straight ahead with an offset load of shot rock, this TD-25, belonging to Morris Enterprises, demonstrates the capacity-adding Planet Power steering principle. Operator keeps bank-side track in high range, leaves other in low range, to stay on course, with full power "harnessed." This producer removes about half of a 35' overburden with crawlers—takes off the balance with dragline.



**International®
Construction
Equipment**

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Illinois.
A COMPLETE POWER PACKAGE

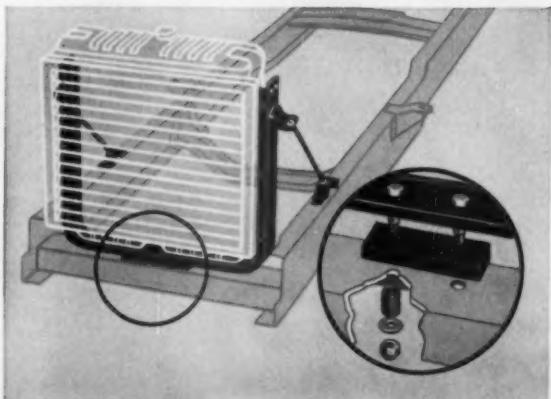


FORD HEAVY DUTY CONSTRUCTION

Ford's 1961 Heavy Duties are especially designed and built to stand up under the severe strains of off-road work. Heavier gauge steel, sturdier reinforcements and new independent mounting systems to separate radiator, fenders and cab are utilized on all heavy-duty conventional trucks, F-800 Series and up (plus all T-Series Tandems). This stronger construction with each component *individually* frame-supported doubles radiator and sheet metal life—cuts downtime and maintenance expense.

Heavier gauge metal in radiator tanks and headers resists vibration, jolts and corrosion for greater reliability. Ford's "lock-seam" radiator construction doubles the solder area at key seams for greatly increased strength and longer radiator life.

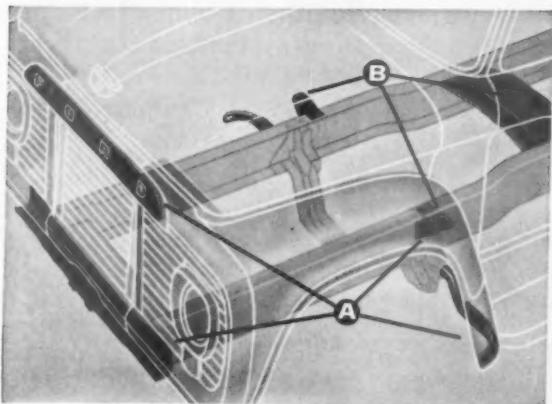
Special "horse collar" mounting of radiator (shown at right) separates it from front-end sheet metal. Resilient rubber mounting on frame cross member, shown in insert, soaks up road shocks . . . cuts wear and tear on entire cooling system. Diagonal braces at each side are attached to frame for added support.



QUALITY-BUILT...
FORD TRUCKS



DOUBLES RADIATOR, FENDER AND CAB LIFE



MAINTENANCE-ENGINEERED
COST LESS FORD DIVISION
Ford Motor Company.

Fender mountings, independent of both cab and grille, eliminate stress transfers for increased fender life. Each fender is assembled as a unit which includes the headlight panel and apron. The complete assembly is supported at the four points (A) as shown at left. Lower supports are on a rubber-cushioned transverse bracket at the front and a frame-mounted bracket at the rear. The upper front sections of the two fender assemblies are tied together by the nameplate panel which is independent of the center section of the grille. The upper rear support is at an angle bracket bolted to the frame. The removal of only nine bolts makes it easy to pull a fender for maximum accessibility to the engine area.

New triangular cab mounting system (B) provides increased driver comfort and greater cab durability. Two outboard front mounts, plus a centered "twin" rear mount, form a triangular system that holds the cab stationary while allowing the frame to move independently . . . reducing strain on the cab.

25% heavier gauge sheet metal in fenders, cab floor, and toeboard further increases life and provides greater resistance to corrosion.

ROCK PRODUCTS, August, 1961

Enter 1009 on Reader Card

MAGNETIC SEPARATION



Stop tramp iron damage
before it costs you money.
LET DINGS DO IT.



Here's just one way—
Dings magnetic pulleys, elec-
tro or permanent, are at
work pulling unwanted iron
out of everything from grain
to cotton...to chemicals and
molybdenum ore.

If you think this
hunk of iron is beat up,
you should see
the other guy!

The "other guy" was a crusher. The unhappy owners learned the hard way that lazy tramp iron has no respect for costly, hard working machinery.

Any plant *without* a magnetic separator need only compare the cost in both repair and production delay—with the cost of a magnet.

Many plants *with* magnets that are over 10 years old have found that they can quickly write off the cost of a new, improved Dings unit...in savings. And, Dings has an electric or non/electric unit for installation in, on or above *any* processing or materials handling system.



Dings

DINGS MAGNETIC SEPARATOR COMPANY

4773 West Electric Avenue, Milwaukee 46, Wis.

For over sixty years—Industry's Specialists for magnetic
separation . . . concentration . . . materials handling

ROCKY'S NOTES

by Nathan C. Rockwood



Chemical & natural control of pests

THE TITLE ABOVE is that of a new book* which may seem odd to be reviewing here. However, the title did attract us because we have had so much to say about soils and soil fertility. It seemed that in order to sell farmers soil amendments or rock product fertilizers such as lime, limestone, gypsum, rock phosphate, etc., the salesman should know a little something about the other problems of agriculture. Certainly plant diseases, insects and pests are very real problems, and they are getting worse as the years go by. Moreover, in the opinion of a few experts, some of the chemicals used to control these pests and diseases are gradually, but inevitably, ruining and poisoning the soil, from which all human food comes in one form or another. In other words, the good expected of rock product fertilizers may be seriously affected by the use of these powerful chemicals.

We had another objective in mind, and that was a hope of finding some verification of a long-held theory that healthy plants grown on virgin or adequate soils are not bothered much by plant diseases and pests. That is not an original theory, for it was proposed by the author of a book called "Bread from Stones" nearly a century ago. It seems to have been entirely overlooked, possibly because most of our cultivable soils have long since passed the stage where such a correlation would be observed. It seems a reasonable assumption since it is one of the laws of nature that only the hardy and healthy of any species of plant or animal survive very long without artificial help.

We do find a bit of indirect evidence to support our theory in the fact that one of the "natural" methods of combating plant disease and pests is to seek out and develop strains of plants, generally cereals, that show immunity or special resistance to some one or more of these diseases or pests. Apparently, the specialists who discover or devel-

op such kinds of vegetation are not especially interested in how or why plants gained their resistance qualities. It might easily be because they happened to grow originally on especially healthy, or mineralogically adequate soils. It is a fact that they tend to lose their special qualities when grown in a new environment, where the soil is probably deficient in some one or more necessary elements.

To get back to the subject of the book itself, "natural" control of plant disease, insects and pests is, as noted above, seeking out and developing resistant varieties, and/or importing insects or parasites of one kind or another, which serve mankind by feeding upon or destroying the harmful pests and fungi. In other words, if the "balance of nature" can be restored, or developed, nature itself will provide the cure for many man-made unbalances and their accompanying ills. But entomologists and plant pathologists apparently are not primarily concerned with the man-made unbalance of the soil itself, which is probably the fundamental cause of all our difficulties in trying to stay alive and healthy.

The book is not too technical, since its author states its purpose is "to assist the manufacturer, research worker, instructor and farmer in evaluating the most effective methods of pest control." All insects are not harmful. As he says in his preface: "Accumulated tree trunks, roots and leaves would soon encumber the earth if they were not converted into their original compounds and elements. This is accomplished by the combined attacks of various insects supplemented by several types of bacteria and fungi. Dead bodies of insects and larger animals are attacked by flesh flies, burying beetles, hide beetles and bacteria. The combined attack on vegetative and animal matter results in the formation of humus and various chemical compounds which serve as food for soil bacteria and plant growth." Turn to page 116

**Chemical & natural control of pests*, by E. R. deLong, Reinhold Publishing Corp., 430 Park Ave., N.Y. 22, N.Y., price \$7.50

Two Aggregate Plant Owners



966 WITH A 4-YD. LIGHT MATERIAL BUCKET LOADS 25% FASTER, WORKS MORE STOCKPILES

CRUSHED ROCK PRODUCTS, INC., Schenectady, N. Y., wanted a dependable, big-capacity wheel loader for their two-shifts-a-day limestone plant. They bought a new 140 HP* Cat 966 Wheel Loader. Results? "It's doing better than we had hoped," says Plant Supt. Carl Alger. "Production's up 25% over our elevating bucket loader, and the 966 can run from one stockpile to another in a hurry."

Alger's satisfaction is no surprise. Other plant owners report low-cost high production is routine with the 966 because Cat power shift transmission, automatic bucket positioners and power-boosted steering and brakes do all of the heavy work, make the operator's job easier. Fast cycle time is maintained from the beginning to the end of each shift.

Power shift gives him instant shifting, forward and reverse, first and second speeds. Dual ratio steering, exclusive on the 966, boosts production too. In work range the operator can make a full turn with only a half whirl of the steering wheel—makes speedy loading cycles easy; for fast travel between stockpiles, or on the highway, the travel range gives safe, automotive steering response.

Production—good; availability—good; and how about maintenance? Operator Jim Galusha reports everyday maintenance takes only five to ten minutes. He adds that it's easy to climb on and off the wide-open 966—a handy feature when you're on and off a machine all day long. "Visibility," he says, "is excellent even with the big 4-yd. special bucket."

Report on Cat Wheel Loaders



944 FEEDS HOPPER—600-FT. ROUND TRIP IN 57 SECONDS—LOADS TRUCKS, DOES UTILITY WORK

BURBANK ROCK COMPANY, Ponca City, Oklahoma, needed a fast-moving general-purpose wheel loader to feed their screening-washing system and load out finished product. Their Caterpillar Dealer recommended the 944 with a 2-yd. bucket. Leo York, plant superintendent, reports they use the 944 about half the time to charge a hopper with ½-in. limestone chips for screening and washing. The rest of the day the 944 loads trucks from stockpiles, moves equipment around the plant and does general maintenance work.

The 944's profile tells you it's the machine to handle many jobs. Bucket lift arms and cylinders are forward, giving the 944 the reach and lift for easy loading of hoppers, trucks or railroad cars. Operators push the 944 hard, too, because they're not bothered by mechanisms raising and

lowering beside them. Never have to worry about a load spilling back on them, either.

The 944 is powered by a thrifty, 105 flywheel horsepower turbocharged Cat Diesel Engine, with a gasoline engine optional. The same option applies to the 80 HP* 922.

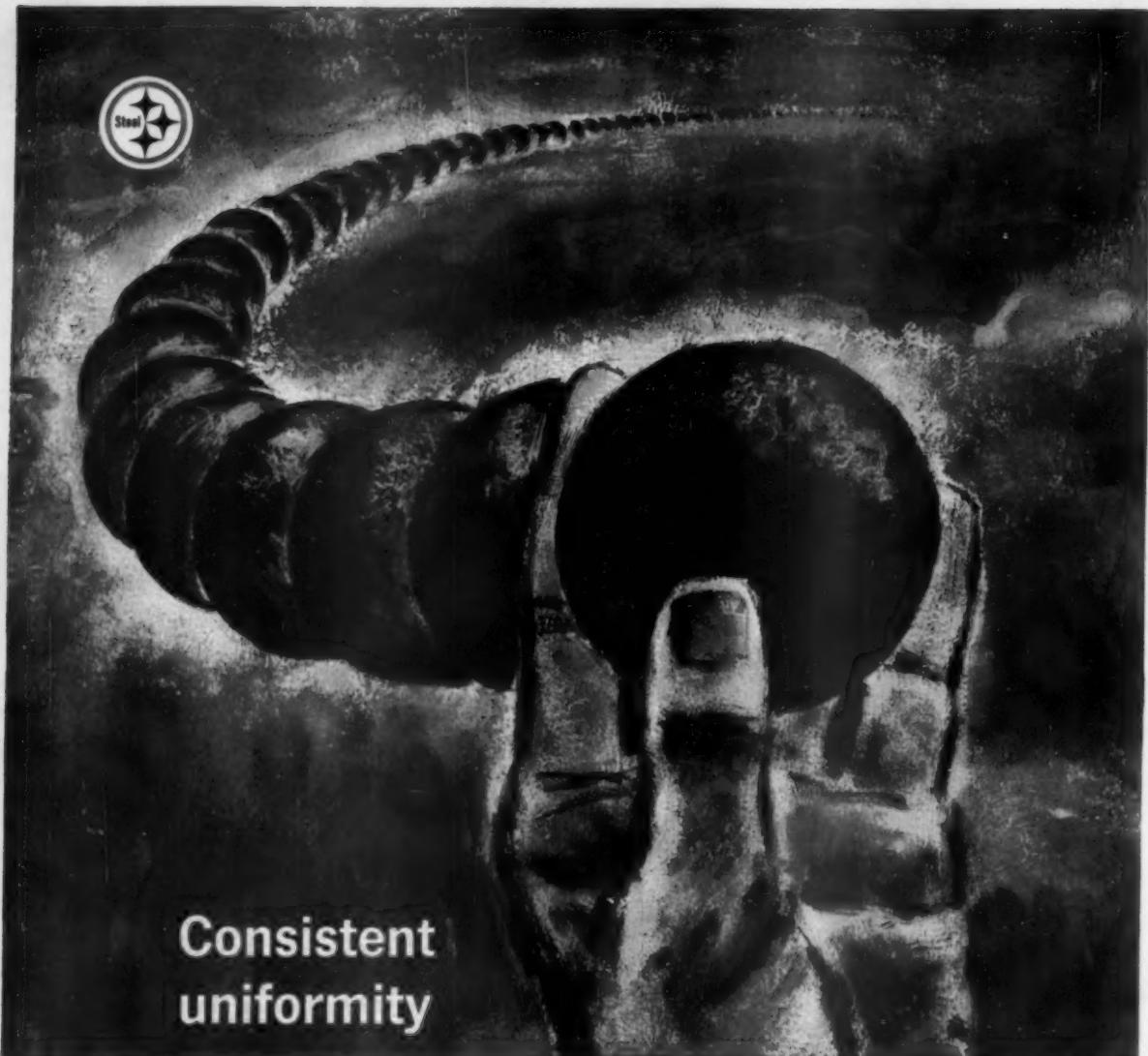
One common equipment requirement of aggregate plant operators is machine endurance. You want low-cost, long-time, fast production without maintenance headaches. That's why more and more plant operators rely on Cat Wheel Loaders. If you need a powerful loader with fast wheel mobility and a wide range of bucket sizes, check with your Caterpillar Dealer. He'll solve your loading problems for a long time to come.

*All horsepower specifications are flywheel ratings.

CATERPILLAR

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Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.



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uniformity**

has earned customer acceptance

Consistent uniformity, right down to the core, is a big reason why more than a million tons of Sheffield Grinding Balls have been used in every kind of grinding job, around the world. They're uniformly hard, uniformly tough, with a uniformly dense grain structure throughout. That's why Moly-Cop Balls keep their sphericity longer, give a better grind at a lower cost per ton. It's the result of Sheffield's constant quality control in alloying, forging and heat-treating. **Sheffield Division, Armco Steel Corporation, Sheffield Station, Kansas City 25, Mo.**

**SHEFFIELD
MOLY-COP
Grinding Balls**

ARMCO **Sheffield Division**

Enter 1004 on Reader Card

WASHINGTON LETTER

by Edgar Poe

Shipments Asphalt Rose in '60

20,075,713 short tons. With the exception of 1957, asphalt shipments have shown a steady annual rise. Asphalt for paving purposes, (the principal use—73 percent of total shipments) increased 1 percent in 1960, compared with 9 percent in 1959. Asphalt for use in roofing products increased 7 percent, and all other uses declined 2 percent. Road oil shipments were 2 percent higher for the year.

Reported shipments of bituminous limestone by producing companies decreased 18 percent to 1,236,000 short tons in 1960. Value decreased from \$3,810,000 in 1959 to \$3,009,000 in 1960. While bituminous sandstone shipments decreased from 9,488 short tons in 1959 to 7,216 short tons in 1960, the value increased from \$58,000 in 1959 to \$61,000 in 1960. All of the bituminous limestone was mined in Alabama, Oklahoma and Texas, and the sandstone was produced only in Missouri.

Interstate Highways Opening

Construction is underway on another 4,650 miles of the proposed 41,000-mile system. Engineering on right-of-way acquisition is underway on another 10,600 miles. The Bureau is hopeful of completing the entire program on schedule.

Two Hundred Million ARA Program

former Secretary of Labor & Industry for Pennsylvania, is heading ARA, an agency of the Department of Commerce. Area redevelopment programs are being approved on the basis of eligibility of an area due to unemployment and an over-all economic development plan blueprinted by leaders of the local areas.

Under the Area Redevelopment Act, loan funds out of a \$200-million fund are being executed. William L. Batt,

executed. William L. Batt, conforming to civil defense standards. Apparently persons owning the shelters are apprehensive that neighbors probably will rush toward bomb shelter doors—any bomb shelter doors—if bombs were dropped. Interest in bomb shelters is increasing because of the increased turmoil around the world.

Please turn page

A survey by the Bureau of Mines shows asphalt and asphaltic products shipments increased 2 percent in 1960 to

Individual and commercial loans to communities provide the major type of assistance. Other types are loans and grants for public facilities, technical assistance, occupational training and retaining subsistence payments. Funds for the whole program will amount to more than \$400 million.

Loans for industrial and commercial projects will finance the purchase of land and facilities, including the construction of new buildings and the rehabilitation of old or abandoned ones. Loans for machinery and equipment may also be granted.

Each industrial project is expected to have support of both public and private interests, which will share the cost with the federal government. The most the federal government will put up is 65 percent. The interest rate on a federal loan will be based on the current average yield of U. S. Treasury long term bonds, plus one-half of one percent for overhead.

The law provides \$100 million for loans and \$75 million for grants where public facilities are needed or establishment or expansion of specific industrial or commercial plants.

The law also provides technical assistance grants amounting to \$4.5 million annually, and an equal amount each year for training or retraining unemployed workers in an area for work in new plants.

For additional information industry, management and engineers may communicate with the agency by writing Area Redevelopment Administration, U. S. Department of Commerce, Washington 25, D. C.

Company Building Shelters

A spokesman for the Laurel, Md., Concrete Products, Inc., said residents buying or considering pre-fab concrete underground bomb shelters ask that the transaction not be disclosed. The company builds shelters conforming to civil defense standards. Apparently persons owning the shelters are apprehensive that neighbors probably will rush toward bomb shelter doors—any bomb shelter doors—if bombs were dropped. Interest in bomb shelters is increasing because of the increased turmoil around the world.

Washington Letter

continued ...

California Studies air Pollution

A major study of the effects of air pollution, emanating primarily from motor vehicles, is underway in California. The study, described by the U. S. Public Health Service officials as the largest research project of its kind in history, is being closely watched by interested federal agencies. It is being conducted jointly by the Los Angeles County Air Pollution Control District and the University of Southern California.

Mice, guinea pigs and rabbits are housed at four Los Angeles County test stations at varying distances from heavily traveled highways. The control group is breathing only purified air.

Public Health Service scientists assert that the test will provide them an opportunity to see effects in animals during short periods which in human beings might take decades to occur.

ICC target For sharp Criticism

The Interstate Commerce Commission has become the target for some heavy criticism. The chairman of the Senate Commerce Committee, Senator Warren Magnuson (D-Wash.), accuses the regulatory agency of being "a group of apologists for a deteriorating system." The Westerner charges that the Commission has failed to implement the National Transportation Policy, contending that Congress did not intend that "unrestrained competition live until interstate common carriage died, and decisions be delayed because they were too tough to make." Magnuson says his committee will work with the White House to give all forms of transportation the "decisive, efficient, far-thinking regulatory patterns they deserve." He is opposing creation of a single transportation agency to replace ICC.

Curb law Sought on Identical bids

Congress appears likely to pass stronger laws designed to greatly curb or stamp out identical bidding. Legislation to stop firms from submitting exact bids to the federal government is under consideration. The pending measure closely follows President Kennedy's order that all identical bids submitted to the government be announced publicly by the Justice Department. The bill has the backing of the department. Lee Loevinger, head of its anti-trust division, says the proposal would be an effective deterrent to collusive bidding. However, some Congressmen do not believe that it goes far

enough. They are seeking stricter criminal prosecution for collusive identical bidding, in which a firm would have to prove there was no collusion if it submitted a bid identical to a competitor.

FAA submits Airport plan To Congress

A report by the Federal Aviation Agency is before Congress, declaring that a total of 465 new airports should be built and 2,834 existing airports should be improved if the nation's civil aviation needs are to be met over the next five years. The estimate was made in the Agency's National Airport Plan for 1961, which lists, city by city and state by state, those airports requiring improvements and those communities where new airports will be needed.

While no Federal funds are provided by the National Airport Plan, the total cost of the improvements projected in the Plan is estimated at approximately \$1.1 billion over the five-year period. Nearly \$900 million of this amount would be needed for purchasing land, preparing sites and paving runways, taxiways and aprons. The remaining \$200 million includes the cost of installing runway and guidance lighting, improving or building FAA control towers and establishing public use facilities.

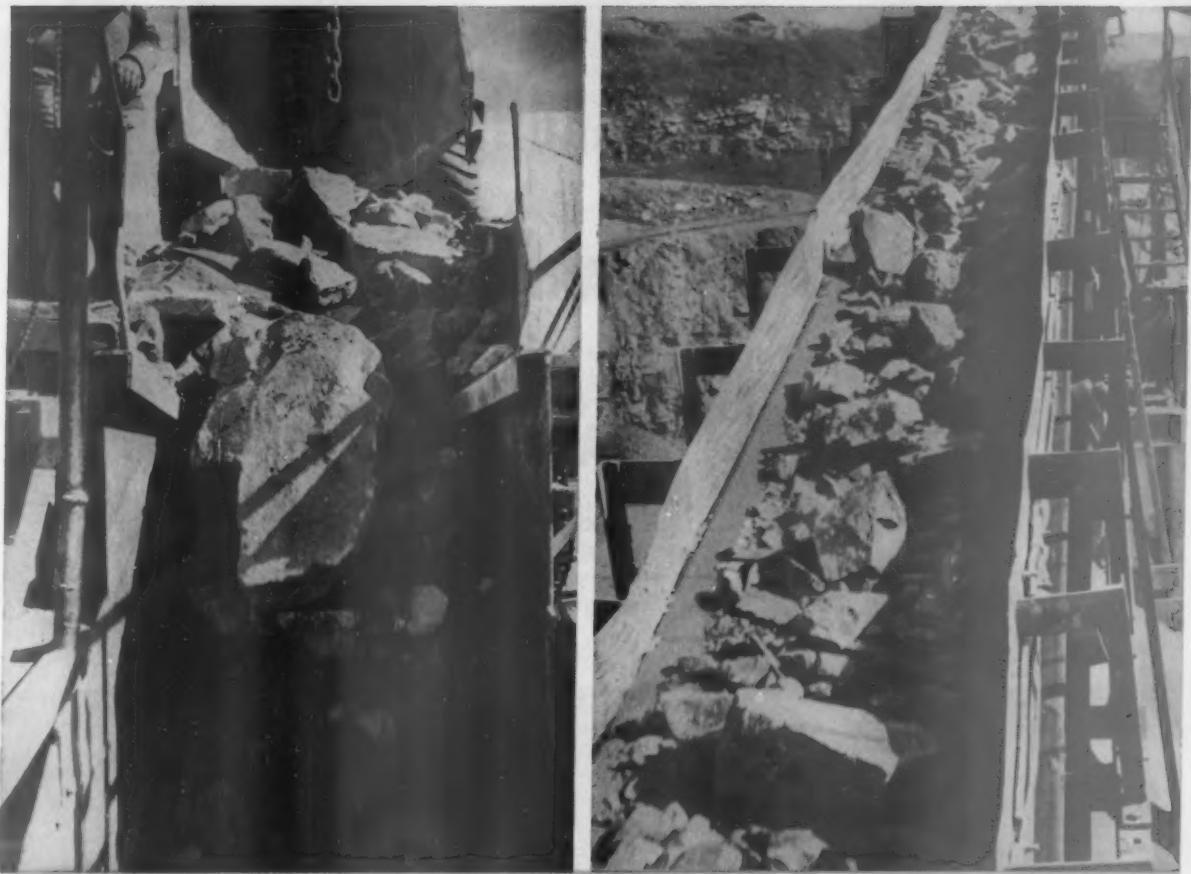
Court rules For merging Railroads

Before it recessed for the summer, the Supreme Court of the United States ruled in favor of railroads in their efforts to merge. The tribunal held that merging railways do not have to keep on unneeded workers regardless of labor contracts or other provisions.

However, the court ruled that the railroads must follow the Interstate Commerce Commission rules, which provides for full pay for discharged workers. The decision grew out of the merger of the Erie with the Delaware, Lackawanna & Western.

Goldberg's Labor Proposal

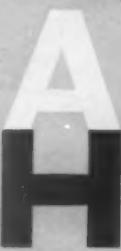
Labor Secretary Goldberg wants cities and states to set up labor-management committees to deal with problems of strikes, automation, productivity and wage-price policy. Goldberg hopes these groups will be set up after the example of President Kennedy's national labor-management advisory committee, which draws membership from labor, management and the general public.



Acme-Hamilton introduces "Hy-Impact" *Conveyor Belt with "Shock-Weve"!*

Over 500,000 tons of rock have been hauled from the primary crusher on new "Hy-Impact" belt at each of three well known plants across the country where 200,000 to 250,000 tons of rock hauled on regular belt was considered normal service life before replacement. For the past two years, Acme-Hamilton has been testing this completely new belt at these plants. To date they have hauled over 500,000 tons each without downtime due to damage, reslicing or replacement. Examination by engineers shows an expected service life of several hundred thousand more tons.

New "Shock-Weve" fabric construction is responsible for this overwhelming service life. Priced the same as conventional belting, "Hy-Impact" reduces cost by half or more because of its doubled service life. Write for more information about this new money-saving belt today. Dept. B-H.



Acme/Hamilton

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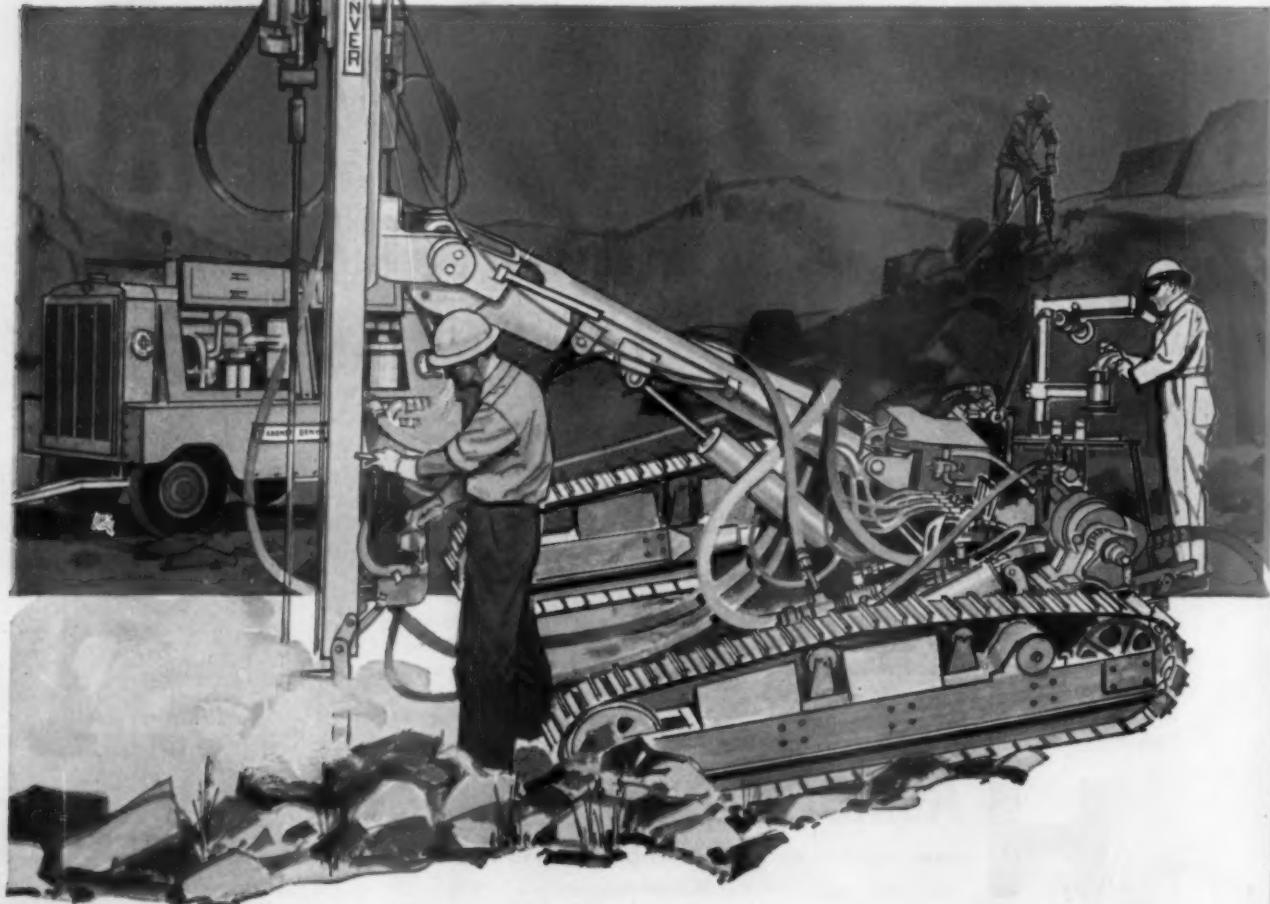
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ROCK PRODUCTS, August, 1961

GARDNER-DENVER GOES ALL

HARD ROCK? TOUGH ROCK? RAVELLY GROUND?

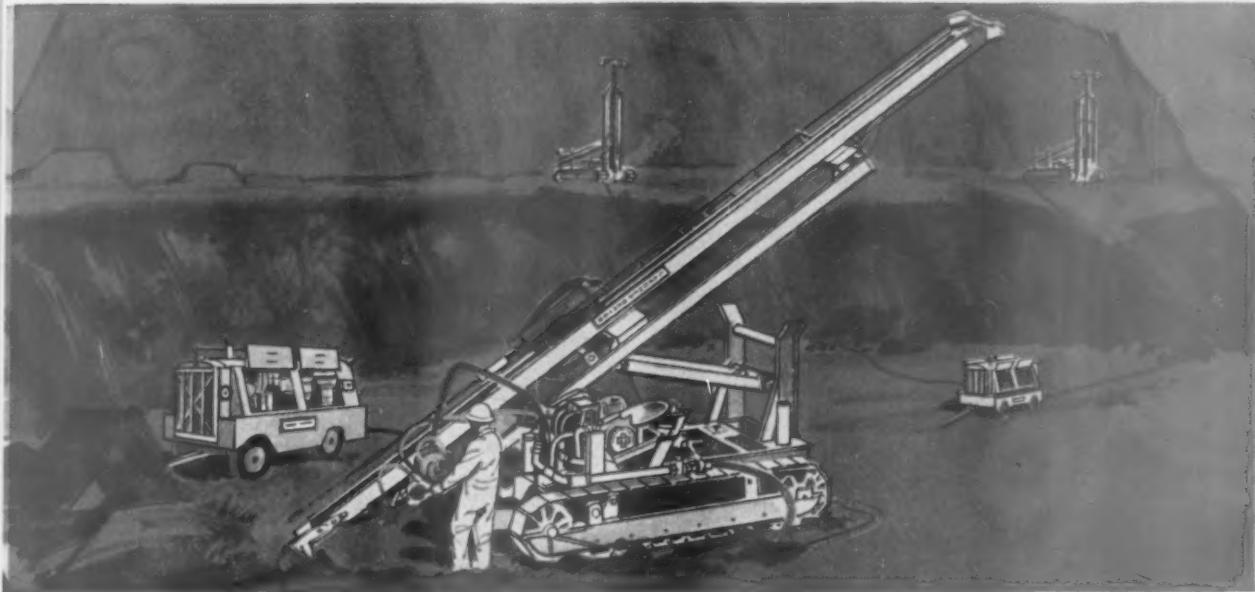
When you're figuring close on rock drilling costs, the Gardner-Denver Specialist can help you pull together *the fastest rock drilling task force you ever saw!*



THE WAY TO HELP YOU EARN MORE PROFITS

- • Heavy-Duty HT143 Crawler Drill with 5½" percussion drill for big bore blast hole drilling.
- • "Air Trac"® Crawler Drills that outmaneuver anything else on the market.
- • Hydraulic Booms and Drill Positioners that spot the hole right where your powder man says it should go.
- • Chain Feed Masts that keep a steady pressure on the bit and make every hammer blow count. Hydraulic extension takes longer steel.
- • Power Rotation Rock Drills that provide absolute control of rotation without impact . . . impact without rotation . . . impact and rotation . . . for faster penetration.
- • Remote Controls permit operator to position drill and to control drilling cycle from most convenient spot. Save time.
- • Carburized Sectional Rod and Couplings with the new "HI-LEED"® thread that joins sections firmly for greater impact transmission . . . yet always uncouples quickly. Known for long service.
- • Carbide Insert Rock Bits that match the extra life and efficiency of Gardner-Denver steel.
- • Pneumatic Bit Grinders that keep your bits sharp right at the rig.
- • Air Line Oilers to keep your rock drills and tools properly lubricated for longer life.
- • Hand-Held Drills for trimming and secondary blasting. A size and weight for every type of rock.
- • And for low-cost air power—the new Gardner-Denver Rota-Screw Portables provide immediate, steady compressed air in any weather or climate. They'll slash your maintenance costs because there are no blades or other moving parts in the compression chamber.

SEE YOUR GARDNER-DENVER ROCK DRILL SPECIALIST BEFORE YOU BID ON YOUR NEXT JOB



PLUS SERVICES

ARE BASIC AT GARDNER-DENVER:

Sizes and models to suit job requirements • Specialists help you choose correct equipment • Demonstrations of equipment in the field • Ready supplies of replacement parts anywhere • Trained technicians to give you mechanical help • Engineered durability and maintenance economy • Pace-setting new products to meet job demands.

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

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Enter 1069 on Reader Card

ROCK PRODUCTS, August, 1961

EIGHT TESTED—LORAIN



Two Lorain Moto-Loaders, Model ML-309, with 9000 lbs. operating capacity, are shown loading shot rock at the quarry face. One is equipped with a 3-yd. bucket, the other with a 4-yd. bucket.

Mr. Robert A. Silvernail, Superintendent, describes the Best operation as a quarry and a processing plant where the rock is processed, dried, sorted and graded for the market, plus a concrete block plant known as Bestone Inc.

MOTO-LOADERS® CHOSEN

Walter C. Best Inc. at Chardon, Ohio, tested eight different makes of front end loaders, including Lorains, in their quarry. After several thousand hours of carefully documented, on-the-job operation in 1960, they unhesitatingly chose Lorain Moto-Loaders. Two Lorain Moto-Loaders ML-309 have been handling all the production on this operation since January 1961 without a single hour of down time. Much of the 200,000-ton yearly output of silica sand and aggregate is handled 2 or 3 times.

Replaces 8 pieces of other equipment

The two Moto-Loaders replaced a whole fleet of other types of equipment and made it possible for Best to revise completely their production procedures.

Less than half the capital needed

Because less equipment is needed, less capital investment is required. Best claims they reduced their capital needs by more than 50% by turning to the Moto-Loader method.

Man-hours reduced 75%

Labor costs went down drastically after the Moto-Loaders were installed. Man-hours were reduced from 120 to 30 a day.

Down time eliminated

Robert A. Silvernail, Best's Superintendent, says, "The rugged dependability of these units saves us hundreds of dollars in down time a year. They simply do not break down, and maintenance is confined to lubrication and oil changes. This can spell the difference between profit and loss on many an operation. *There has been no down time for any other reason.*"

Versatility is invaluable

Mr. Silvernail continues, "We don't believe there is anything these Moto-Loaders can't do. They have loaded trucks with the shot rock, stockpiled materials, stripped overburden, cleaned out a swamp, moved a 2-ft. layer of rock to grade for a road, dug excavations, moved trees and heavy machinery, cleared snow, pushed and towed trucks and railroad cars, charged bins and substituted for winches. You name it and Moto-Loaders do it for us. They are invaluable. Either machine is ready at any time to do the work of four

different ones, at four different places and you know that this kind of versatility makes them pay and is saving you money."

One Moto-Loader double-shifted

During eight months of the test period one Moto-Loader was double shifted for a total of 2300 hours of service and loaded out 100,000 tons of stockpiled material to trucks in that period.

Moto-Loaders balance important—Drivers find them less tiring

The balance of power, weight and control contributes heavily to the performance of these Lorains. "The ML-309's are splendidly balanced, even at full load, which makes them easy to operate. The drivers find them less tiring, and this contributes to the men's efficiency and safety on the job," is the way Mr. Silvernail puts it.

Other features, too

To get the kind of dependable, cost-cutting performance experienced by Best requires many advanced design, construction and operating features. You don't out-perform seven other top brands of loaders without real, solid reasons. Here are some of them.

One-foot control. Control of selection of forward and reverse and acceleration is done with just one foot. Both hands free for steering and other controls.

Four-speed, full-power shift gives continuous straight-through, full-power shifting from 1 to 4 without stopping for selection. This Lorain Moto-Matic Transmission, plus torque converter speeds up cycles.

"Safety" arms, S-shaped for greater reach, provide full side visibility at all times. The bottom edges stay below cockpit sides at all times for complete safety.

Better tractive effort is obtained through 4-wheel drive using planetary axles with high traction differentials. Torque is kept at the ground where it belongs.

Want to know more? Why not see your nearby Moto-Loader dealer for all the reasons? Or arrange a demonstration so you can see for yourself what a Lorain Moto-Loader can do. You'll be glad you did.

THE THEW SHOVEL COMPANY, LORAIN, OHIO

LORAIN®
DOES MORE
FASTER • FOR LESS

PLANTS in Lorain and Elyria, Ohio.
PRODUCTS—Power shovels, cranes, draglines, clamshells, and hoes on crawlers from $\frac{1}{2}$ - to $2\frac{1}{2}$ -yard capacity • Cranes from 7 to 80 tons . . . on crawlers, and as rubber tire Moto-Cranes, and Self-Propelled Cranes • Rubber tire front-end Moto-Loaders in 6,000-lb., 7,000-lb., and 9,000-lb. operating capacities.

OUTLETS—Lorain products sold and serviced by 249 distributor outlets throughout the world.

Enter 1089 on Reader Card

ROCK PRODUCTS, August, 1961

LABOR RELATIONS

A roundup of actual day-to-day in-plant problems
and how they were handled by management men

How would you decide?

What precautions must you take when using a test to select the most able worker?

What Happened: There was a job vacancy. The contract provided that "any employe who has the ability and physical fitness to perform the work" may apply for the job. When there is more than one applicant, "the employe with longest seniority gets it."

Three men applied for the job. The plant engineer prepared 5 questions which he asked each man. One worker withdrew his application. Henry Black, the man with the greatest seniority, was able to answer only 2 questions. Jack Gordon, the most junior man, got all the correct answers. In view of his performance on the test and his background as an instructor at an Industrial Training Institute, Gordon got the promotion.

Henry Black claimed that his experience and seniority qualified him for the promotion:

1. The contract says that the most senior man gets preference.

2. All I have to prove is that I have the ability to do the job. The work I now do proves it.

3. It isn't fair for the company to use a written test like this until after the union is consulted.

The company maintained that it had always chosen the applicant with the ability to do the work, regardless of seniority. It argued that Jack Gordon is fully qualified — while Henry Black could not pass the test and had no experience with the field.

Was the company: Right? Wrong?

What Arbitrator Warns ruled: "There is no evidence that this examination had ever been given before or that the company had pre-tested these questions to prove their validity for the job in question. It is not sufficient to say that any electrician should know the answers — the sole question is whether an employe in this company could show his qualifications by his answers on this test. The question whether the company can unilaterally give a test to determine 'ability' depends on many factors—including the requirement that the test be a reliable and valid one. The 5-question examination was improper in this case."

During times of financial trouble, can you eliminate employe services without union approval?

What Happened: For 15 years the company had provided the special services of the cashier's window on company time without loss of pay. This meant that employes could transact personal business, cash checks, buy money orders, etc., at any time.

Because of financial troubles, management reduced costs wherever possible. One economy was that employes were allowed to use these services only during the lunch hour and after 3 p.m. The union protested. The company finally agreed that employes could use the services dur-

ing working hours, but that they would not be paid for the time.

The union opposed even this:

1. Services which have been provided for 15 years are a part of the working conditions.

2. Management can't change any working conditions without the approval of the union.

The company felt that its right to manage the business was being attacked:

1. The matter of these services is not in the agreement. The company has the right to make its own decision.

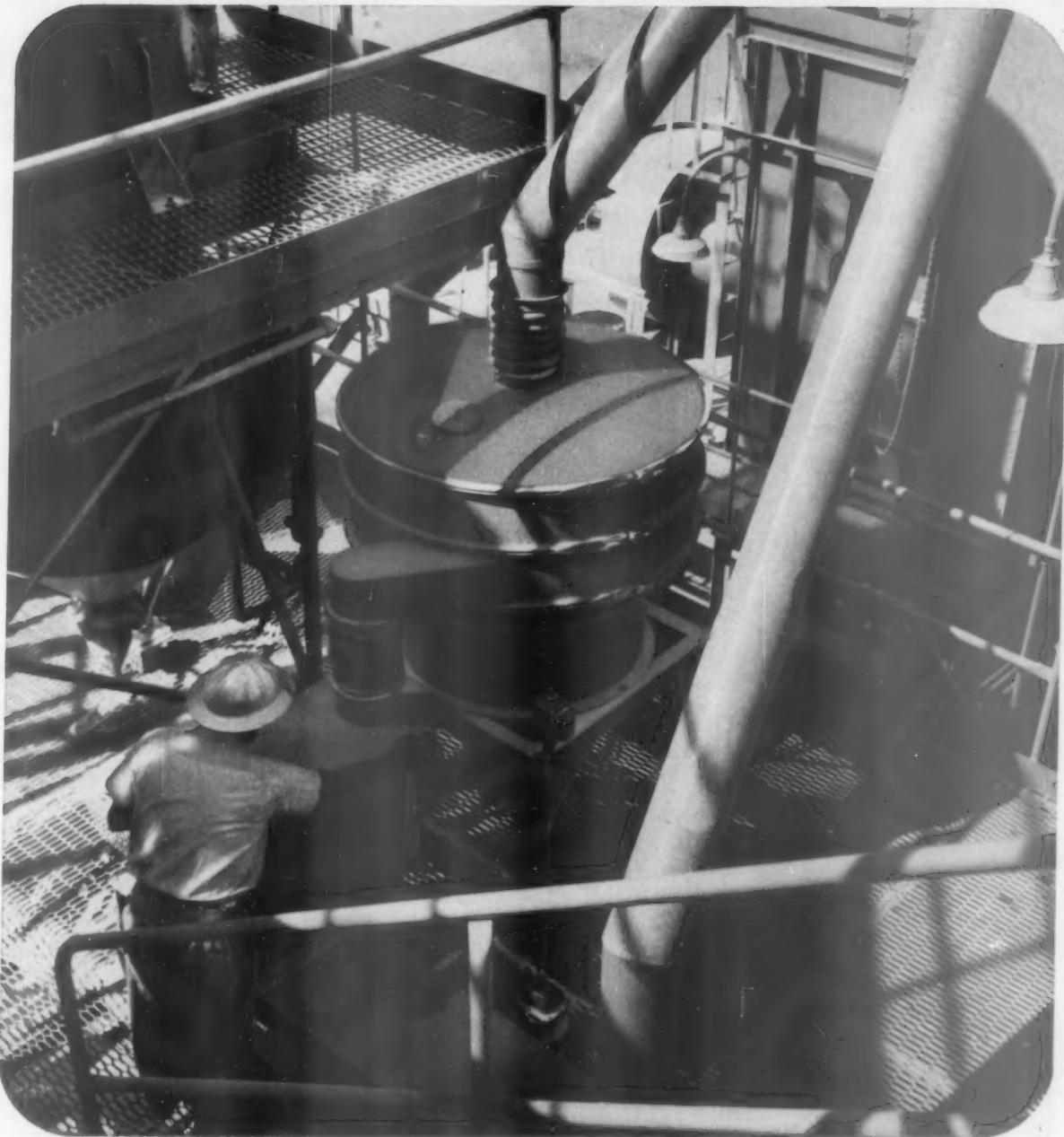
2. As a matter of good faith, the company did discuss this problem with the union.

3. These services are a luxury—and the union never protested in the past when luxury services were eliminated.

4. We have been working short weeks for a year. It is urgent to the interests of employees and of management that efficiency be promoted.

Was the company: Right? Wrong?

What Arbitrator Fallon ruled: "These services were a convenience for the employes, but are subordinate to the greater consideration of efficiency of operation during a critical period in the company's struggle for survival. A union yields a benefit it has enjoyed for many years only with great reluctance—but this is the type of benefit which, if eliminated, may assist in obtaining other benefits."



U.S. Gypsum installs 24 Sweco separators in 16 plants

United States Gypsum Company's experience with SWECO Vibro-Energy* Separator performance ranges over 10 years and a variety of demanding applications. As a result of proved efficiency, economy and versatility, another sweco unit was selected for installation at its recently completed, modern New Orleans quicklime facility. Also, the "turnkey" contract for design, engineering and construction was awarded to Southwestern Engineering Company.

This single-deck, 48" diameter sweco unit is equipped with a $\frac{3}{8}$ " clear-opening screen cloth for processing cal-

cined clam shells. Material runs from fines to 2" pieces, at 100-150°F and 58-60 lbs. per cu. ft. High capacity throughput with no screen blinding yields low operating and maintenance costs. Simplicity of design and lack of transmitted vibration required minimum space and structural support. For full details, application data, or free screening demonstration in your plant with your materials, write SOUTHWESTERN ENGINEERING CO., 4800 Santa Fe Avenue, Los Angeles 58, Calif. Department 5314.

*Vibro-Energy separators, grinding mills, finishing mills



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How to drown a valley—

DUKE POWER COMPANY COWANS FORD STATION

TYPE	CONCRETE & EARTH FILL	VOLUME OF MATERIALS
MAXIMUM HEIGHT	405 FEET	350,000 CUBIC YARDS
LENGTH OF SPILLWAY	465 FEET	350,000
LENGTH OF WEST EARTH DAM	3054 FEET	782 FEET
LENGTH OF EAST EARTH DAM	2178 FEET	782 FEET
LENGTH OF EARTH & CONCRETE	722 FEET	5000 ACRES FEET
LENGTH OF LAKE	33.6 MILES	1510 ACRES
DRAINAGE AREA		1770 SQUARE MILES

ENOUGH CONCRETE
WILL BE PLACED IN
THIS DAM TO BUILD A
SKYWALK (750 FEET
LONG) ONE WIDE OR 4
INCHES THICK.

CONCRETE	EARTH
ELABORATION TOP OF SPILLWAY GATES	782 FEET
ELEVATION BOTTOM OF SPILLWAY	782 FEET
MAXIMUM STORAGE (RESERVOIR)	5000 ACRES FEET
MAXIMUM STORAGE AREA	1510 ACRES

WHEN COMPLETED
THIS PLANT WILL BE THE
FOURTH LARGEST CAPACITY
PRIVATELY OWNED HYDROELECTRIC
POWER PLANT IN THE UNITED
STATES WITH A CAPACITY OF 350
000 KILOWATTS.

DUKE POWER COMPANY'S CEDARAPIDS PLANT

- 42" x 48" Single Jaw Crusher Primary
- 5'x12' Inclined Scalping Screen
- 4½" Symons® Standard Cone Crusher
- 4" Symons® Short Head Cone Crusher
- Two 5'x14' Horizontal Vibrating Screens
- One 4'x12' Horizontal Vibrating Screen
- One 5'x12' Horizontal Vibrating Screen
- 40" x 16'6" Heavy-Duty Model CSF Feeder
- 13 "Strigid" Lattice Frame Conveyors

(Symons—a registered *Nordberg* trademark)



with Cedarapids production

300 TONS PER HOUR of 100% crushed aggregate! That's the way to get a dam job finished in a hurry . . . and that's exactly what Duke Power Company is doing with this cleanly-engineered Cedarapids Stationary Plant. The job is the Cowans Ford hydroelectric project, 22 miles northwest of Charlotte, North Carolina, on the Catawba River. Duke Power Company is supplying its own needs for strict specification aggregate. Crushing 90% granite and 10% diorite, with the 42" x 48" jaw crusher set at a 6" opening, they are producing four sizes . . . -6" plus 3"; -3" plus 1½"; -1½"

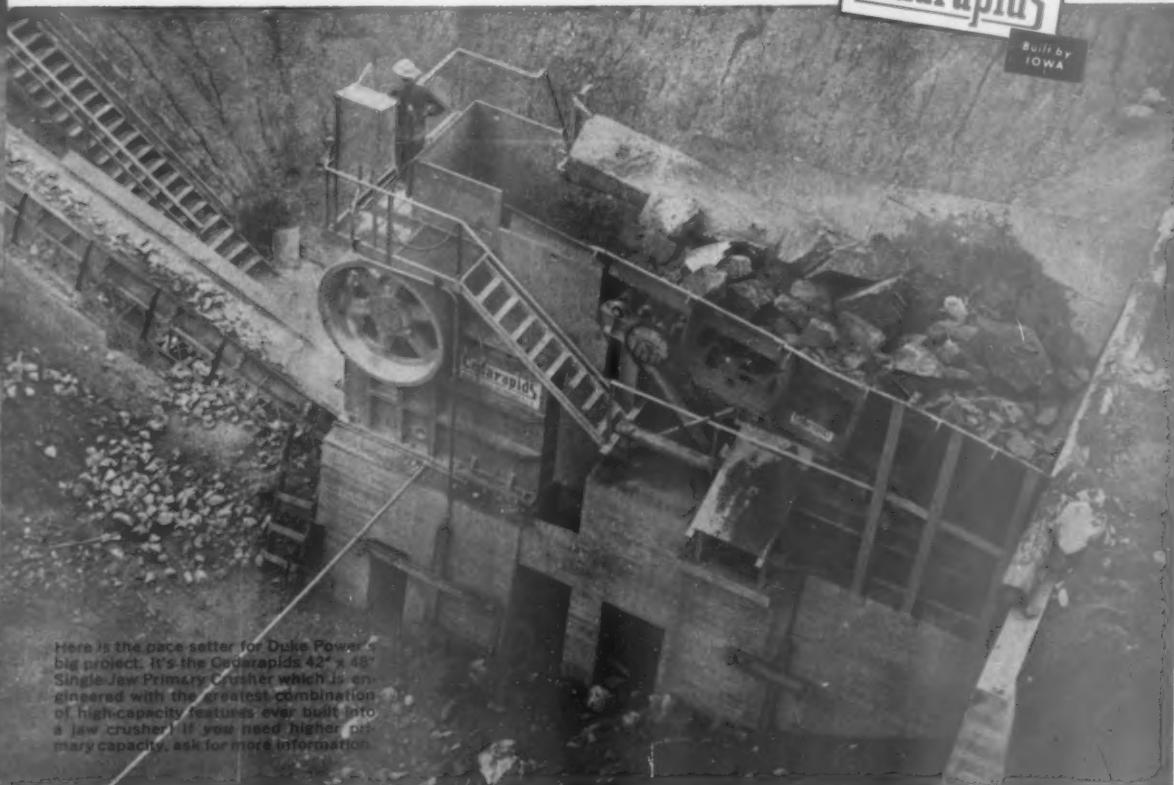
plus ¾"; and -¾" plus #4.

A different dam job, or a highway job, or any other job requiring aggregate, demands an entirely different crushing plant set-up . . . and that's where you profit with a Cedarapids-Engineered Plant. Cedarapids-Engineering means a plant tailor-made for *your* specific conditions, with each component production-balanced with all the others to assure highest capacity at lowest cost per ton. Your near-by Cedarapids Dealer can explain the advantages of Cedarapids-Engineering, or write direct to:

IOWA MANUFACTURING COMPANY
CEDAR RAPIDS, IOWA



Built by
IOWA



Here is the pace-setter for Duke Power's big project. It's the Cedarapids 42" x 48" Single-Jaw Primary Crusher which is engineered with the greatest combination of high-capacity features ever built into a jaw crusher! If you need higher primary capacity, ask for more information.

How to get a

CEDARAPIDS-ENGINEERED

STATIONARY PLANT

that's "tailored"
to your job

Gentlemen: Please send details about Cedarapids-Engineering assistance for my stationary plant operations.

NAME _____

COMPANY _____

ADDRESS _____

CITY & STATE _____

8-161N
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PEOPLE IN THE NEWS



C. R. Lorenz, Jr.



H. V. DeWalt

Dravo Keystone Div. promotes Lorenz and DeWalt

Charles R. Lorenz, Jr. has been appointed assistant to the president of the Potomac Sand and Gravel Co., Washington, D.C., recently-formed subsidiary of Dravo Corp. He was formerly manager of the South Side (Pittsburgh) plant of the Keystone Div. and will be succeeded in this position by H. Verne DeWalt, a salesman in the division.

Mr. Lorenz joined the Keystone Div. in 1951 as assistant plant engineer. He was promoted to plant maintenance engineer in 1954 and assistant to the opera-

tions manager in 1956. A native of Hartford, Conn., Mr. Lorenz is a graduate of Worcester Polytechnic Institute, Worcester, Mass., with a BS degree in the mechanical engineering field.

Mr. DeWalt, a native of Claridge, Pa., joined the Keystone Div. in 1938. He has served successively as foreman, supervisor and manager of the division's Neville Island, Aliquippa and Leetsdale plants. He was plant manager and dredge captain until 1950 when he was transferred to the sales force.

Ohio River Sand Company elects new president

Allan P. Taylor, vice president and secretary of the Ohio River Sand Co. for the past six years, has been elected president of the company to succeed Chester P. Hegan, who has been made chairman of the board of directors. Mr. Hegan has been president for six years.

Mr. Taylor has been with Ohio

River Sand for nine years, starting as an engineer. He previously had been with American Air Filter Co. for 17 years.

Harry C. Aldrich, who has been treasurer for the last six years, has been elected vice president and treasurer, and J. Edwin Rankin, division sales manager, has been named secretary.

C.V.O. Hughes becomes phosphate manager

C. V. O. Hughes (below) has been appointed manager of the Nichols, Fla., phosphate mining operations of Virginia-Carolina Chemical Corp., Richmond, Va. Mr. Hughes, who has been associated with the company for 10 years, succeeds H. L. Pascoe, who has been named special assistant to the vice president for mining. A graduate of Columbia College, New York City, Mr.



Hughes joined V-C as a mining engineer and later became appointed assistant manager of the Florida operation.

Robert S. Murphy, formerly superintendent of the fertilizer plant in Nichols, has been named personnel manager and safety director.

Richards named plant manager of Bestwall

T. W. Richards has been promoted from assistant manager to manager of the Sigurd, Utah,

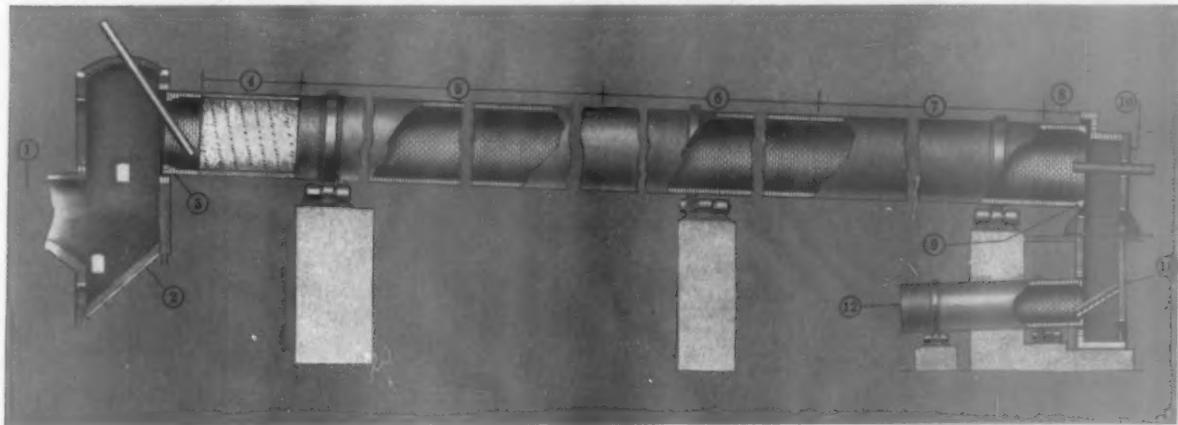
Please turn to page 38

A. P. Green Refractories

**lessen "down time"
resist wear
in these
12 cement kiln areas**

Burning temperatures, chemical composition of the charge and many other factors affect the life of refractory linings in cement kilns. For many years the A. P. Green Company has been solving refractory kiln problems for major producers throughout the

world. A. P. Green has the right product for each zone of your kiln... regardless of service conditions. Whether you require fireclay, high alumina, basic, or monolithic refractories, A. P. Green is your assurance of extra long service life.



REFRACTORY REQUIREMENTS IN A TYPICAL WET PROCESS ROTARY KILN INSTALLATION

- **Waste Heat Boiler**—Moderate duty service required. Use EMPIRE or OZARK Dry Press firebrick.
- **Dust Collectors**—Firebrick masonry or monolithic construction. Use EMPIRE or OZARK Dry Press firebrick or A. P. Green Castables.
- **Feed End or Tail Ring Construction**—Requires mechanical strength, structural stability and uniformity. Use CLIPPER or EMPIRE firebrick.
- **Drying Zone**—Requires resistance to abrasion and density to withstand moisture penetration. Use EMPIRE D. P. or EMPIRE (Cooler) Liners. Also, GREENCAST -12, MC-22, or MC-25 Castables.
- **Pre-heating Zone**—Requires strength, uniformity, resistance to abrasion. Use EMPIRE Liners.
- **Intermediate Zone**—Requires resistance to abrasion and spalling. Use A. P. Green HOT ZONE Liners.
- **Burning Zone**—Requires resistance to chemical attack, slagging, spalling and abrasion. Use KRUZITE 70% Alumina Liners...the standard for the burning zone.
- **Cooling Zone**—Requires resistance to abrasion and spalling. Use A. P. Green HOT ZONE Liners.
- **Discharge or Nose Ring Blocks**—Requires mechanical strength, dimensional uniformity and resistance to thermal spalling. Use MEX-KO (Super Duty) or 68B (Semi-Silicon Carbide).
- **Kiln Hood**—Requires resistance to spalling. Use MEX-KO, EMPIRE or A. P. Green Plastic construction.
- **Clinker Chute**—Requires resistance to abrasion and spalling. Use EMPIRE.
- **Cooler**—Requires resistance to abrasion and spalling. Use EMPIRE Liners.

However, quality products alone are not enough. They must be properly installed. And, A. P. Green Installation Engineers have the job experience to assure your complete satisfaction. Their experience covers jobs of all sizes, from small vertical lime kilns to the largest rotary cement kilns on the North American Continent. A. P. Green Services Division—Bigelow-Liptak Corporation is the largest refractory installation organization in the world.



A. P. GREEN FIRE BRICK COMPANY

Mexico, Missouri, U.S.A.

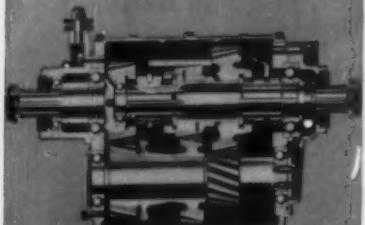
PLANTS: Mexico, Mo.—Woodbridge, N. J.—Sulphur Springs, Texas—Jackson, Oak Hill, South Webster, Ohio—Climax, Tarentum, Philadelphia, Pa.—Troy, Idaho—Pueblo, Colo.—Macon, Ga.—Birmingham, Ala.

SUBSIDIARY: Bigelow-Liptak Corporation, Detroit, Michigan

IN CANADA: A. P. Green Fire Brick Company, Ltd., Toronto (Weston), Ontario

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- High Capacity
- Low Initial Cost
- Reduced Maintenance
- Flexibility of Ratios



for heavy duty trucks and tractors,
specify one of the eight

Fuller '92 Series 3-Speed Auxiliary Transmissions

available from all truck manufacturers upon specification.
Top-mounted power take-off optional.

'92 SERIES (Heavy-Duty) RATIOS

MODEL	SPLITTER RATIOS		DEEP REDUCTION
	High	Intermediate	
3-A-92	.74	1.00	2.09
3-B-92	.84	1.00	1.24
3-C-92	.75	1.00	2.64
3-D-92	.75	1.00	1.24
3-E-92	.84	1.00	2.09
3-F-92	.84	1.00	2.64
3-G-92	1.00	1.327	2.09
3-H-92	1.00	1.327	2.64

For the right transmission
for every operation

Specify



Specify the MODEL

FULLER TRANSMISSION
DIVISION

EATON MANUFACTURING COMPANY
KALAMAZOO, MICHIGAN

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People in the News

continued from page 36

plant of Bestwall Gypsum Co., Ardmore, Pa. He succeeds E. L. Flinn, who has retired.

Mr. Richards is a native of Milwaukee, Wis., and a graduate of the Missouri School of Mines. He became affiliated with the gypsum industry at Ft. Dodge, Iowa, where he served as rock preparation foreman for the National Gypsum Co. He joined U. S. Gypsum Co. in 1953 and in May 1960 became associated with Bestwall Gypsum as assistant manager of the Sigurd plant.

and chairman of the Cement Marketing Co. of Australia Pty., Ltd., before moving to Singapore to take charge of exports of cement to the Far East.

In his new appointment as vice president and general manager of the British Columbia Cement Co., Mr. Brabant succeeds B. Franklin Cox, who has returned to England to assume other duties with the Associated Portland Cement Manufacturers Ltd.

Hawkeye-Marquette president retires

G. F. Hetherington, president and sales manager of the Hawkeye-Marquette Cement Co., Des Moines, Iowa, has retired after 40 years of service with the company and its parent organization, Marquette Cement Manufacturing Co., Chicago, Ill. His duties as sales chief have been assumed by M. C. Miller, vice president.

Mr. Hetherington joined Marquette as salesman in 1919. In 1940, when Marquette purchased the Hawkeye Portland Cement Co., he was elected vice president and sales manager. In 1946 he was made president.

Georgia Marble elects officers and directors

Nelson Severinghaus has been elected a member of the board of directors of Georgia Marble Co., Tate, Ga., to succeed G. Arthur Austin, who has retired. Mr. Severinghaus is vice president and manager of the firm's Consolidated Quarries Division.

S. E. Hyatt has been promoted from first vice president to executive vice president; William L. Vance from senior vice president to first vice president; and Harry Mathewson from vice president-finance to senior vice president.

Please turn to page 41

Better products, *faster*, from your National Seal distributor:



When the dust flies, rely on National

National Oil Seals protect you from costly equipment failures when the going gets rough. Dust, mud, and dirt are bearings' worst enemies. Bearing failure means equipment failure, which amounts to lost time and money. National Oil Seals—the best money can buy—give you the protection you need to keep rolling right up to the wire no matter how

tough the job, how tight the schedule.

National Micro-Torc® leather and Syntech rubber come in standard and made-to-order sizes. They seal out bearing trouble and seal in lubrication to keep equipment working and earning. So it's good common sense to call your National Seal Distributor for all replacements.



NATIONAL OIL SEALS

FEDERAL-MOGUL SERVICE

DIVISION OF FEDERAL-MOGUL-BOWER BEARINGS, INC. • DETROIT 13, MICHIGAN



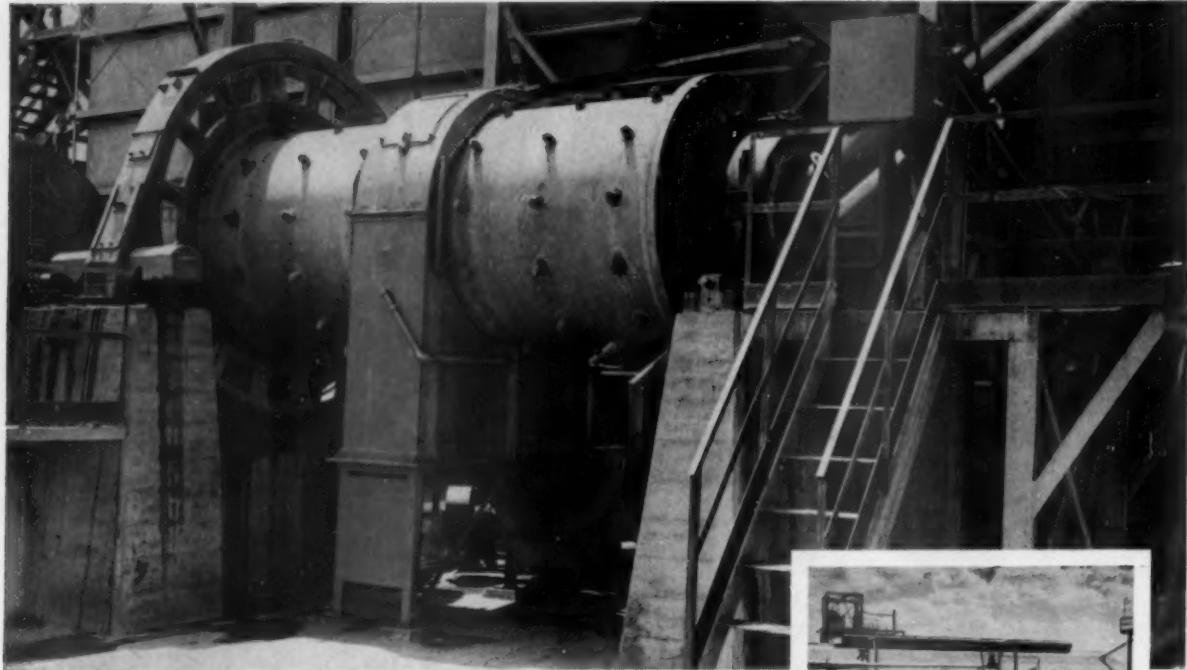
ROCK PRODUCTS, August, 1961

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If you are short on natural sand

Manufacture it on the job . . . by grinding stone or waste pea gravel in a Marcy Center Peripheral Discharge Rod Mill . . . for as low as 25¢ per ton. Marcy grinding produces a superior, cubical product for blending to meet the most rigid specifications. Eliminates hauling costs, too.

Also, this makes you more competitive...by cutting costs and having a better product.



Washing and Classifying . . . with the Akins Classifier you can wash, deslime, dewater, and remove or save sand sizes as desired. Akins provides a large, working pool area necessary to do this job efficiently.



Heavy media separation . . . many deposits can be most efficiently treated by heavy media separation. The Akins large, working pool area permits close control of products from feed of variable quality and quantity.



WRITE FOR CATALOGS

**The Company
that cares enough
to give you
the best!**

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Manufacturing Division

MINE AND SMOLETER SUPPLY CO.

DENVER 16 NEW YORK 17 SALT LAKE CITY 1 EL PASO ALBUQUERQUE
3800 RACE ST. 122 E. 42nd ST. 121 W. 2nd ST. 1515 11TH AVE. 701 HAINES N.W.

Licensed Manufacturers and Sales Agents in Canada, Australia, Sweden, England, South Africa
Sales Agents in Mexico, Peru, Chile, Philippine Islands, Japan, New York City (for Continental Europe) and in principal cities of the United States.

People in the News

continued from page 38

R. M. Campbell named Flintkote director

R. McLean Campbell has been elected to the board of directors of The Flintkote Co., New York, N.Y., increasing the number of directors from 14 to 15. Mr. Campbell is president of Harry T. Campbell Sons' Corp., Baltimore, Md., which was acquired by Flintkote in March 1960. A native of Maryland and a graduate of Princeton University, he joined the Campbell company in 1953, was elected secretary in 1958, and president in 1961.

Lawton succeeds Moyle as California superintendent

John Q. Lawton has been promoted from assistant superintendent to superintendent of the Mojave, Calif., plant of California Portland Cement Co. He succeeds George A. Moyle, who retired last May. Mr. Lawton joined Arizona Portland Cement Co. in 1949 as chief electrician. In 1954, he was transferred to the Colton plant as assistant electrical engineer where he remained until his transfer to Mojave as assistant superintendent.

SME installs IMD chairman and officers

Carl F. Clausen, director, manufacturing process department, Portland Cement Association, Skokie, Ill., was recently installed as chairman of the Industrial Minerals Division of the Society of Mining Engineers, AIME.

Officers of the Industrial Minerals Division include Leon Dupuy, coordinator of Mineral Resources Studies of River Basins, Bureau of Mines, secretary-treasurer; George F. Pettinos, Jr., president, George F. Pettinos, Inc., vice chairman for the Northeast region; H. E. Uhland,

superintendent of mining and beneficiation for phosphate operations, International Minerals & Chemical Corp., vice chairman for the Southeast region; Frank R. Hunter, chief geologist, industrial minerals division, International Minerals & Chemical Corp., vice chairman for the Mid-Continent region.

New members of the executive committee of the Industrial Minerals Division include Robert S. McClellan, vice president, Gouverneur Talc Co., and Richard H. Johns, chairman, Division of Earth Sciences, The Pennsylvania State University.

Overseas chief named by Lone Star Cement



John C. Mundt has been appointed vice president in charge of administration of foreign subsidiaries, Lone Star Cement Corp., New York, N.Y. He was formerly vice president and manager of the Argentine Portland Cement Co. Mr. Mundt joined Lone Star in 1956 in Uruguay, and two years later became vice president and manager of the Uruguay Portland Cement Co. A graduate of De Pauw University, Mr. Mundt received his LL.B degree from Yale Law School.

Please turn to page 42

Laboratory Crushers and Pulverizers



4" x 6" Massco
Laboratory Jaw
Crusher

Welded steel frame; manganese steel jaw and cheek plates; bronze bushed bearings; smooth jaws give better product and easier cleaning. Adjust for plate wear and product size by convenient hand wheel adjustment.



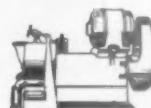
6" and 10" Massco
Gy-Roll Reduction
Crusher

Reduces $\frac{1}{2}$ " feed to as fine as 10 mesh in single pass. High capacity, low power consumption.



Laboratory
Crushing Rolls

Sizes (Diameter x width): 10" x 6" and 12" x 8". Adjustable roll space setting up to $\frac{3}{4}$ ". V-belt drive. Heavy, cast frame absorbs vibration, results in long life.



Massco-McCool
Pulverizers

Disc type grinder with a planetary movement. No gears. Will grind $\frac{1}{4}$ " to 150 mesh in one pass.



Marcy Pulp
Density Scale

Gives direct reading of weight, specific gravity of liquids, pulps, and dry solids; percent solids in pulp. Very accurate. Easy to clean.

MINE AND SMELTER SUPPLY CO.



3800 RACE STREET
DENVER, COLORADO

OFFICES AND
AGENTS IN
PRINCIPAL CITIES

Enter 1037 on Reader Card

FROM CONSTRUCTION WORK TO URANIUM MINING

"Bonded Buy used Cat equipment has always given me first-rate service," says GARN MOODY



Garn Moody has capitalized on his working knowledge of heavy equipment to branch out into a number of successful business operations. From his initial start in contracting, he has put his reliable spread of used Cat-built equipment to work in the non-allied fields of farming and, since late 1958, a thriving strip-mining operation in the rugged country near Delta, Utah.

"When you're moving into an unfamiliar new field, you've got to have smart crews and dependable equipment," says Garn Moody. "My used Cat-built rigs have always given me good steady production. We've worked our two D8s and two DW20s 8 to 10 hours a day since we bought them two years ago. The work is rough, but down time has been light."

Garn has purchased all three types of used equipment his Caterpillar Dealer offers: Bonded Buy, Certified Buy and Buy and Try. "In each case," he says, "the deal worked out fine for me. I'll buy under the same contracts any time. Dependability from Bonded Buy machines is like buying a new machine."

Success is never a sure thing, but if you're expanding your operations and trying to keep your equipment outlay on a budget basis—without sacrificing reliability—check your Caterpillar Dealer's protected purchase plans.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

BEST BUYS IN NEW
AND USED EQUIPMENT

Enter 1038 on Reader Card

42

ROCK PRODUCTS, August, 1961

People in the News
continued from page 41

OBITUARIES



H. Mogens Krabbe, works manager of the Bellingham, Wash., plant of Permanente Cement Co., Oakland, Calif., died suddenly on March 17. He was 58 years old.

Following graduation in 1924 from the University of Washington, Mr. Krabbe held engineering positions involved in the construction or operation of cement plants throughout the eastern states. He returned to Bellingham in 1932 as assistant superintendent and plant engineer of the Olympic Portland Cement Co. Ltd. He became works manager on the retirement of his father, Adolph Krabbe, in 1948, and remained in that position following the purchase of Olympic by Permanente in 1958.

Alfred J. Cayia, retired president of Inland Lime and Stone Co., Manistique, Mich., died April 3. He was 68 years of age. Mr. Cayia had been a member of the firm since 1928, when he started to develop the quarry and construct the plant at Port Inland, Mich. He was a graduate of the University of Michigan with a BS degree in engineering.

END



Shock-Fortified Firestones

ADD TIRE POWER TO TASK FORCES!

You'll beat downtime and add to profits when your quarry trucks roll on Firestone SUPER ROCK GRIP DEEP TREAD tires. Shock-Fortified nylon cord bodies armor these rugged tires against haul impact to keep your quarry equipment working. Extra cut-resistance is built into Firestone quarry tires, too, with long-

wearing Firestone Rubber-X. This exclusive cord-body and rubber combination gives your quarry trucks new staying power under big loads, in the roughest conditions. Put Firestone tires on your quarry equipment—and get the backing of fast, on-the-job service—from your nearby Firestone Dealer or Store.

Always Specify Firestone Tires When Ordering New Equipment.

Firestone

FIRST IN OFF-THE-HIGHWAY TIRE NEEDS

Copyright 1961, The Firestone Tire & Rubber Company

ROCK PRODUCTS, August, 1961

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INDUSTRY NEWS

Up-to-the-minute
cement plant
starts producing
in Tulsa



Limestone tumbles into the primary crusher

Automatic controls rule at the fine new Tulsa, Okla., plant of Dewey Portland Cement Co., div. of American-Marietta Co. And the company's production will be increased over one-third by its 1,250,000-bbl. annual output.

All the varieties of portland cement—regular, moderate heat, air-entraining, 24-hour, and masons cement—are television-monitored from the primary limestone crushing process on. TV cameras can even see into the 425-ft. rotary kiln, where the temperature rises to 2,800 deg.

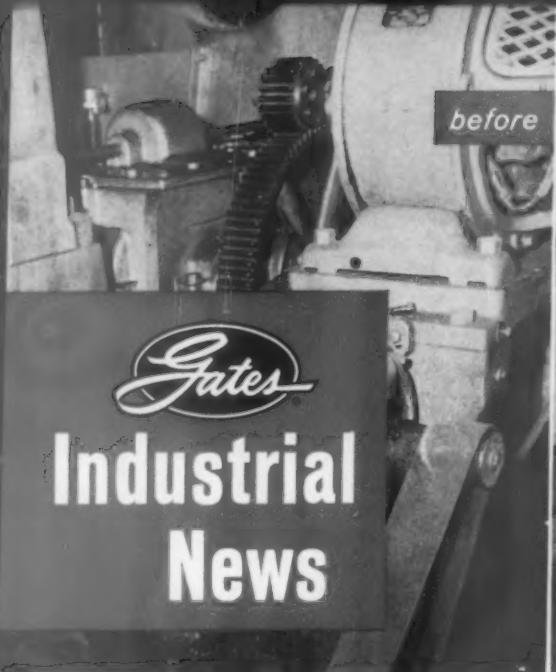
From the central control room all operations can be checked and controlled at instrument consoles. This results in lower labor costs, a more uniform product, and immediate warning when trouble occurs. Conveniently close to the control center is the chemical laboratory. Dewey sees to it that extensive chemical and physical tests are run frequently and at various production stages.

Dust control is a problem that has received much attention at this modern plant. Cloth bag filters are used at dust pick-up points, as well as cyclone collectors. A combination cyclone-baghouse serves the kiln.

Please turn to page 51



TV monitors the primary crusher product



Gates Industrial News

Gear drive caused chatter marks on parts

GATES SUPER HC DRIVE REPLACES GEAR DRIVE IN LIMITED SPACE... *ends costly rejects*

Chatter marks on parts produced by a vertical boring mill at Manitoba Bridge and Engineering Works, Ltd., in Winnipeg resulted in costly rejects. The cause of the chatter marks was traced to the gear and pinion on the main drive.

About a year ago, the plant engineer investigated the possibility of replacing the gear drive with a flat belt or conventional V-belt drive. However, to do the job, both types of drive had to be too large to fit into the limited space available.

Advised by a Gates Representative, he then designed a Gates Super HC High Capacity Drive for the boring mill. He found that the high capacity Gates Drive was so compact that it could readily transmit the required power in the space vacated by the gears. Now, with the smooth-running Gates Drive, the mill is turning out clean, even cuts, eliminating chatter marks.

The Gates Fieldman located near you is a drive design expert. To contact him for help in designing a new drive, or for quick delivery of replacement V-belts, call your nearby Gates Distributor.

Building the future
on 50 years
of progress



The Gates Rubber Company

Denver, Colorado

BP39



Gates Super HC High Capacity Drives replace gear and flat belt drives

Designing a new Drive? Gates High Capacity Drive saves space and money ... cuts bearing loads

When you design a new drive or replacement drive, you can save space, weight and money by using a Gates Super HC V-Belt Drive—the first and most advanced high capacity drive. Because of exclusive design features, this new Gates Drive can often transmit the required horsepower in about half the

space needed by a conventional V-belt drive—with fewer belts and smaller sheaves.

Drive costs are reduced as much as 20%. Drive weight is reduced 20% and more. Guards and machine housings can be smaller, shafts shorter. Reduced weight and overhang on bearings cut bearing loads. Moreover, the Gates Super HC Drive can operate at belt speeds up to 6,000 ft/min without dynamic balancing!



Need replacement V-belts? Why Gates Hi-Power V-Belts are industry's No. 1 choice today

The exclusive construction features of Gates Hi-Power V-Belts—Concave Sides, (U.S. Pat. 1813698) Precisely-Engineered Arched Top, Flex-Bonded Tensile Member—make them more dependable than ordinary conventional V-belts, giving you far longer belt life on even the toughest applications.

Moreover, because of Gates high standards of quality control, you get a perfectly matched set of Hi-Power V-Belts every time—every belt pulls its share of the load throughout the long service of the drive, further increasing belt life.



PICTURE OF EAGLE EXPERIENCE AT WORK

Eagle experience, and quality too, is at work in the plant of Hancock Sand & Gravel Ltd., Sunderland, Ontario, shown. The Eagle Washing-Classifying-Dehydrating Section is highly efficient, economical, makes money for them, "puts life into the sand", as they said. Like many producers in the U.S., Canada and elsewhere, they have found that there is a steady demand for Eagle Processed Sand.

We keep talking about experience because we have learned that while our equipment has been repeatedly copied, the years of experience we have had in the application of our equipment to meet the needs of aggregate producers is something that cannot be copied—it has to be acquired the hard way, which takes lots of time—and we have been at it a long time. There is a price on our equipment, but our experience is *priceless!*

We have cases where producers who have installed competitive equipment have turned to us for Eagle equipment to help them out of difficulties.

It is just as important to us to see that our equipment operates satisfactorily and produces maximum profits for the owner as it is for us to sell equipment. Only operating know how can assure this service. Get fact-pact story—Send for Catalog.

EAGLE IRON WORKS • 137 HOLCOMB AVE. • DES MOINES, IOWA



SINCE 1872



Experience shows up in every piece of

EAGLE FINE MATERIAL WASHER-CLASSIFIER-DEHYDRATOR

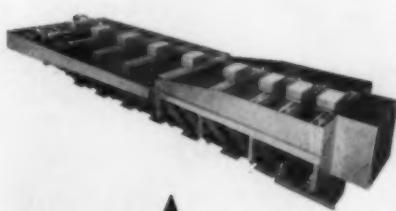


Experience has dictated many design improvements since Eagle introduced its first screw unit—water lubricated lower bearings, feed box designed to retain fines, screw flights with replaceable wear shoes, totally enclosed oil bath gear drive, 3-sided adjustable overflow weir—all Eagle developments. Complete capacity range of sizes in Single and Double Screw Units, up to 54" screw diameter.



EAGLE PORTABLE SAND SECTION

Easy to haul from pit to pit. Washes, classifies and dehydrates just like a stationary sand plant. Consists of Water Scalping-Classifying Tank and two Single Screw Washers. Both screws can produce one gradation of material or each can produce a different gradation simultaneously.



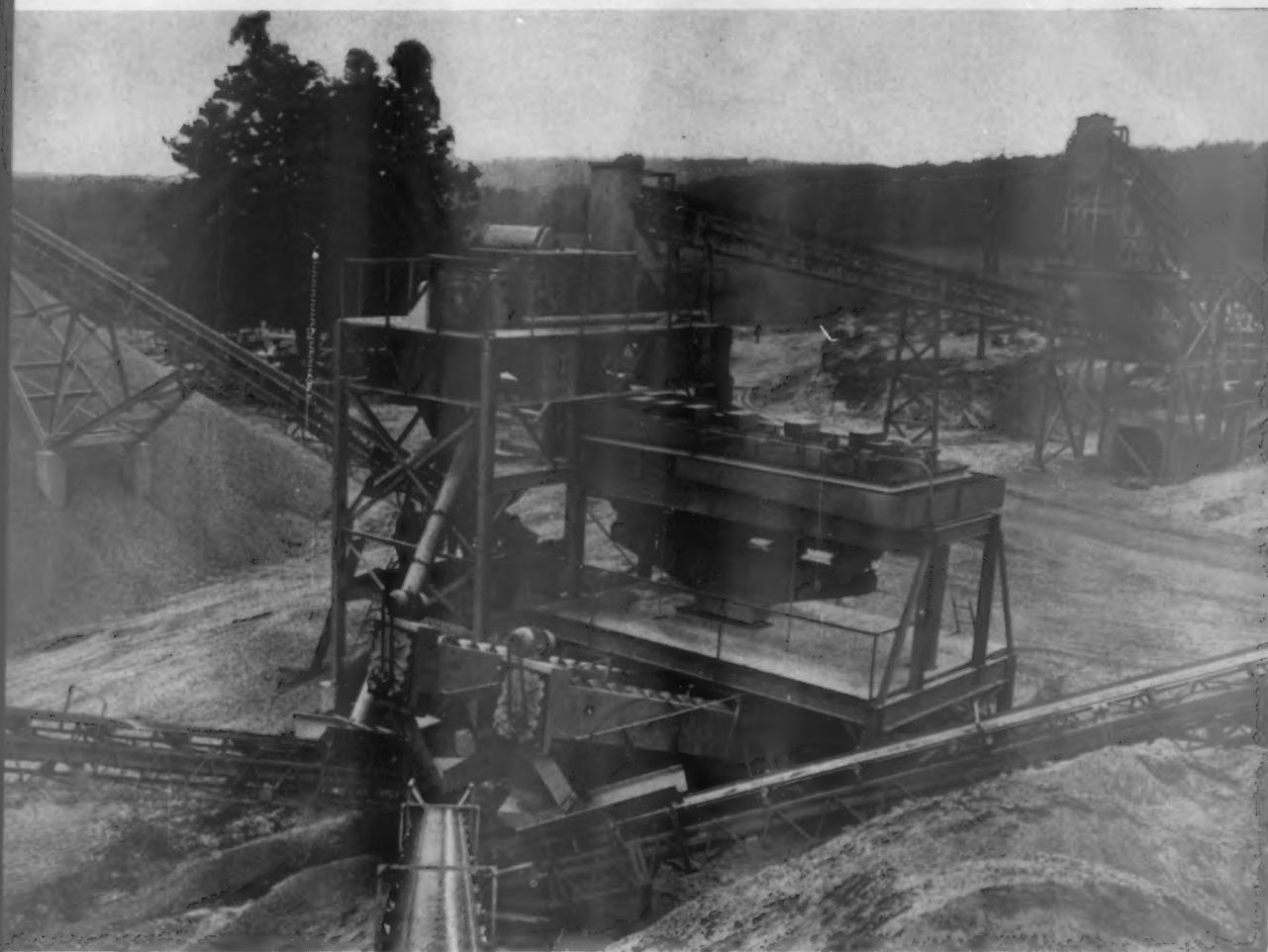
EAGLE WATER SCALPING-CLASSIFYING TANKS

Introduced by Eagle over 12 years ago—still in the lead with superior design—foolproof power-operated bleeder valves, easily adjusted metering splitter gates, easy flow multi-cell collecting-blending flumes and other features. Also smaller tanks for excess water removal exclusively.



▲ SOL-CLAY WASHERS

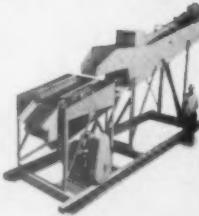
An all-paddle, double log washer that provides greater scrubbing action than the Coarse Material Washer. Washes gravel and stone up to 2½", removing soluble clays.



Eagle Aggregate Processing Equipment!

SLURRY REFUSE SEPARATOR ▶

An adaptation of the Eagle Coarse Material Washer-Dewaterer with Trash Remover Tub End. In this Refuse Separator a slurry consisting of the silt and sand laden wash water is recirculated to aid in flushing out deleterious materials of light specific gravity. The overflow passes over a vibrating screen and the slurry goes to a sump for recirculating.

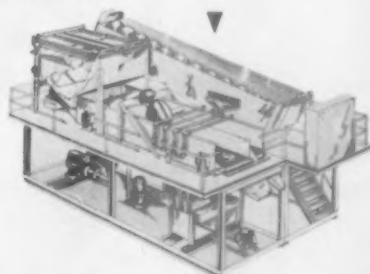


HEAVY MEDIA SEPARATION PLANTS

Most efficient HMS plant today because it uses the patented OCC Separatory Vessel—provides continuous, positive separation of different specific gravity "float" material from the good "sink" material. Offered in stationary form or in 4 block sections for easy transporting and erecting, requiring only simple load bearing footings and minimum of electrical and pipe work.

EAGLE STABILIZED BASE MIXER ▶

For plant mixing of stabilized base material, such as fine and/or coarse aggregate with required additives, aggregates with clay, and a variety of other mixes, including Portland cement and cold asphalt. Water, when used, added by metered volume control. Stationary and self-erecting portable models.



▲ EAGLE LOG WASHERS

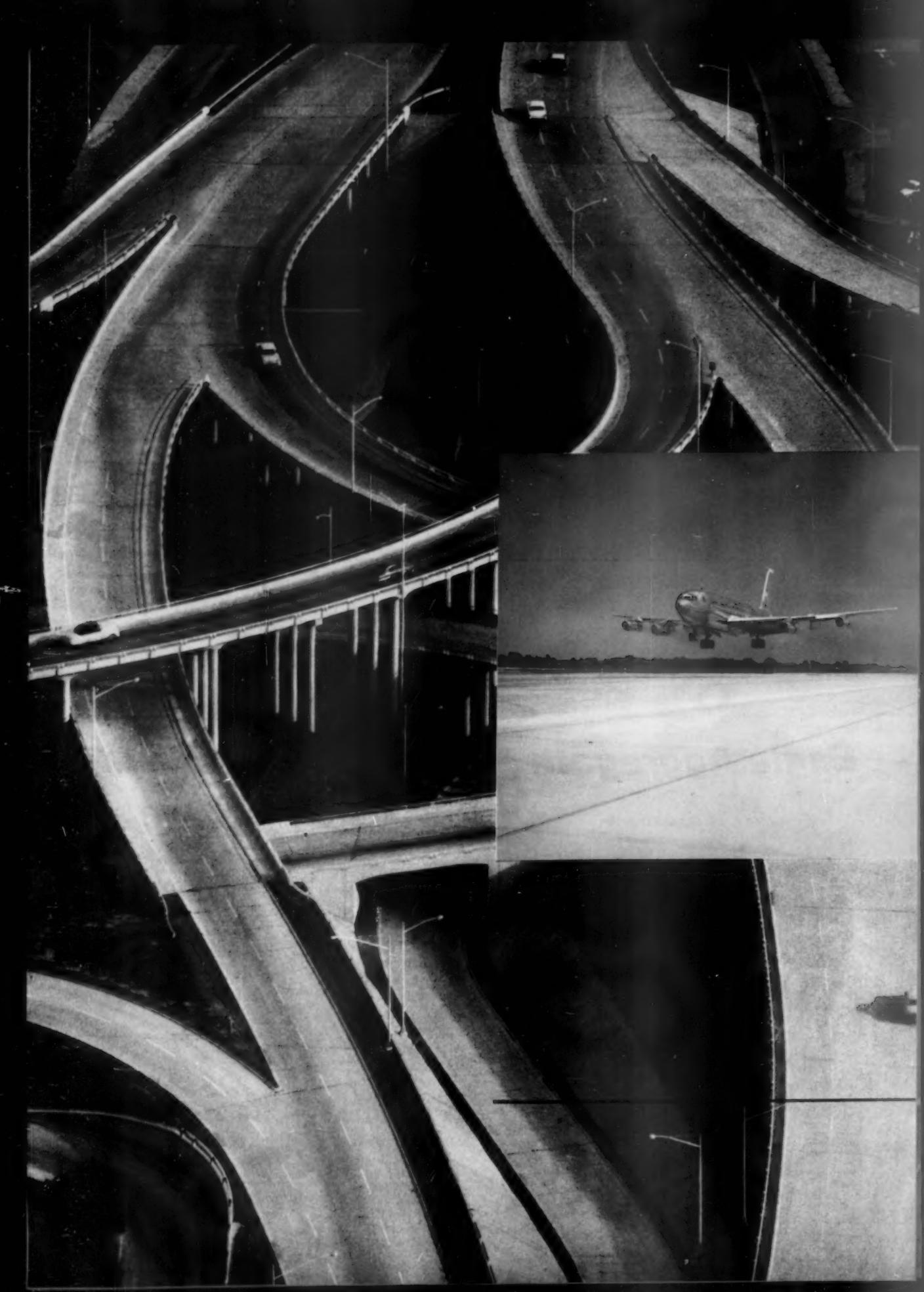
Maximum scrubbing action on minus 4" particles. Scours and abrades gravel, crushed stone or ore. Puts plastic clay into solution, wears away friable foreign material, breaks up and washes away conglomerates. Paddles have renewable Ni-Hard wear resistant shoes. Non-deflecting tubular steel log shafts. Totally enclosed oil bath gear drive.



◀ EAGLE "SWINTEK" DREDGING LADDERS

Eliminate pumping delays and increase production. Traveling chain screens intake nozzle, keeps out boulders and debris which clog lines and cause pump damage. Cutter bars agitate deposit, increase intake of solids, cut through clay strata. Permit recovery from greater depths. Also Eagle All-Steel Dredges, Eagle Cutter Head Ladders and Eagle Dredge Hoists.

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For jet runways and high speed turnpikes . . .

SYMONS® CONE CRUSHERS

**produce big tonnages of quality
construction materials at low cost per ton**



Symons Cone Crushers are built in Standard, Short Head and Intermediate types—with crushing heads from 22" to 10' in diameter, in capacities from 6 to over 1500 tons per hour. Shown above is a typical Symons Cone Crusher installation, producing large tonnages of quality aggregates.

At left is a view of the Fort Worth Interchange, on the Dallas-Fort Worth Turnpike. The inset view shows a jet taking off from one of the modern concrete runways at Chicago's O'Hare International Airport. These are but two of the many examples of the contributions being made by the construction industry in the interest of improved transportation.

Construction for today's transportation needs is highly competitive big business. Competition these days is rough . . . bids must be kept low. More often than not, profit depends on equipment you can rely on for day-after-day output of high tonnages of specification material at low per-ton cost.

Symons Cone Crushers meet these demands for production at a profit. Their unequaled record for consistent dependability under the toughest crushing conditions, low maintenance costs, and high capacity production of finely crushed construction materials is known to contractors, operators and engineers all over the world.

Available for stationary, portable and semi-portable service, Symons Cone Crushers—like all Nordberg machinery and equipment for the construction industry—have become *first choice where maximum output at lowest possible cost is needed.*

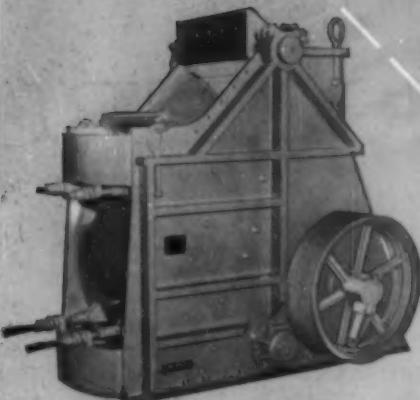
**SYMONS . . . a registered Nordberg trademark
known throughout the world.**



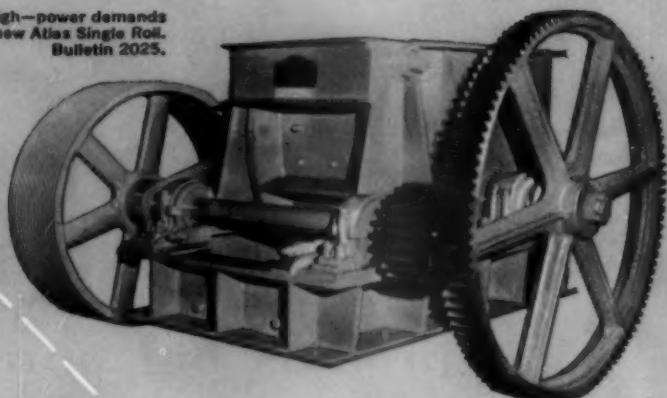
NORDBERG MANUFACTURING COMPANY, Milwaukee 1, Wisconsin

ATLANTA • CLEVELAND • DALLAS • DULUTH • HOUSTON • KANSAS CITY • MINNEAPOLIS • NEW ORLEANS • NEW YORK • PHOENIX
ST. LOUIS • SAN FRANCISCO • TAMPA • WASHINGTON • WICHITA, KANS. • TORONTO • VANCOUVER • JOHANNESBURG • LONDON • MEXICO, D. F.

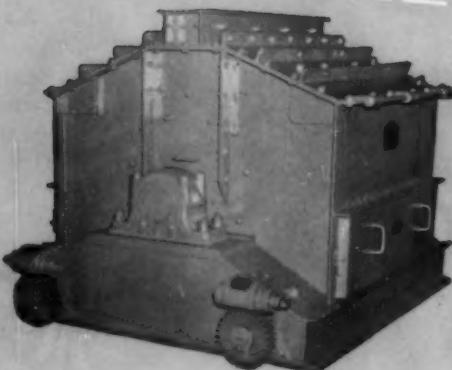
Reduction ratios are high—power demands low—with the new Atlas Single Roll. Bulletin 2025.



Kue-Ken Jaw Crusher uses the famous "crushing without rubbing" principle of operation. Send for Bulletin 5015.



Pennsylvania Reversible Stone Hammermill features 2-zone crushing, high production, low maintenance. Bulletin 1034.



PENNSYLVANIA CRUSHERS will handle all your primary and secondary crushing jobs for agricultural limestone

Efficient, economical preparation of agricultural limestone starts in primary and secondary crushing stages—with Pennsylvania Crushers.

Pennsylvania has a machine to exactly fit *your* need.

Kue-Ken Jaw Crushers, with famous "crushing without rubbing" principle (sizes up to 48" x 60")—or new Atlas, Hercules or Penn-Lehigh Single Roll Crushers

meet all primary requirements. Capacities up to 1200 TPH; feeds up to 32 inches.

Pennsylvania Reversible Hammermills give you exclusive 2-zone crushing in the secondary operation, preparing uniform minus 1½ to 2 inch feed for fine grinding mills, or to furnish the finished product. (One-way hammermills also available.)

Pennsylvania Crushers are rugged "Bath-built" construction, combining latest improvements in design and operation.

LABORATORY TESTING FACILITIES

By making test runs on samples of your material in Pennsylvania's complete testing laboratory, we can determine the best crusher for the job, and also predict precise production results.

Ask your Pennsylvania engineer to prove his case—by test!

PENNSYLVANIA CRUSHER DIVISION
BATH IRON WORKS CORPORATION
WEST CHESTER, PENNA.

PENNSYLVANIA CRUSHERS



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Industry News

continued from page 44



Members of the NLI's Executive Committee attending the Mid-Year meeting are (seated left to right): 1st Vice Chairman W. J. Clark, N.Y.; Chairman of the Board L. R. Falk, Iowa; 2nd Vice Chairman R. E. Meshberger, Ind. Standing (left to right): Directors R. O. Bemis, Ohio, and M. R. Ackland, Ill.; Past Chairman and Director A. R. Alvis, Mo.; Past Presidents and Directors P. W. Seitz, Ind., and J. H. Riddle, Kansas, and Directors G. A. Zeigler, Md., and P. G. Potts, Ky.

NLI board meets

The National Limestone Institute's Board of Directors has voted to increase membership dues and to continue its membership drive through promotion of beneficial services provided to its member by NLI. It changed its by-laws to include a Convention Arrangement Committee as a standing committee and to otherwise increase membership on each standing committee. Six changes were made in membership on the Board, including the election of new members and to take care of Board replacements. Robert M. Bridges, Consumers Company Div., Vulcan Materials Co., was made an honorary director for his past generous and effective efforts in behalf of NLI.

This business, plus acceptance of able reports from nearly a dozen committees, was conducted at NLI's mid-year Board meeting June 11-13 at the Sheraton Park Hotel, Chicago, Ill.

NLI continues to grow. It now has 542 active members and 117 associate members, including 69 members in its Manufacturers' Division. In continuing its effort to grow, it was suggested that the slogan "Each member add a member" be adopted.

The vital problem of percentage depletion was widely discussed. NLI has circulated a questionnaire in an effort to gain statistical information to present to the Internal Revenue Service in defense of its position on IRS Revenue Ruling 61-17. NLI believes that this ruling, which essentially places the cut-off point for figuring depletion allowances after the process of primary crushing, does not apply to the limestone industry. President Robert M. Kock reported that the committee made a favorable impression on IRS people in its May 1961 meeting with them. Yet, there's no progress on 61-17 to date, but opinion is that favorable progress will be made.

Dates for future meetings were set, and plans were discussed for the next annual meeting. Next meeting will be January 15-19, 1962, at the Roney Plaza Hotel in Miami Beach, Fla. Although this will be essentially a meeting of the Board and Committees, all members are invited to attend. NLI's 17th annual convention will be held June 18-21, 1962, at the Statler Hilton Hotel, Washington, D.C. A temporary program for that meeting has been set and details are being worked out.

The Manufacturers' Division held its first formal meeting as a division at the time of the Chicago meeting in June. Wayne King, W. S. Tyler Co., presided as chairman.

Diamond Cement to add bulk loading station

Diamond Portland Cement Co., div. of Flintkote Co., is constructing a bulk cement loading station in Cleveland, Ohio. The \$250,000 facility will be supplied from Middle Branch, Ohio.

Please turn to page 53



NORDBAK

Tough, Resilient,
Non-Metallic

Here it is! NORDBAK . . . the manganese backing you pour at "room temperature." You simply mix the contents of two cans together and pour!

Field tests and on-the-job experience show that NORDBAK really works! Because it's resilient and non-shrinking, it provides excellent backing. It's so tough that in a prolonged test the manganese wore through in spots, but NORDBAK remained uncracked. It's easily removed at changeout, too. You can store NORDBAK at your operations . . . get a supply to keep on hand, ready for the next time you replace liners.

Call, wire or write your order
for NORDBAK!



NORDBAK is a trademark of the Norgberg Mfg. Co.

NORDBERG MFG. CO.

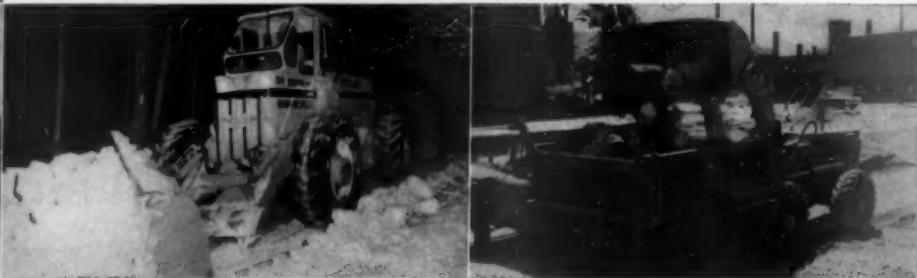
Milwaukee 1, Wisconsin

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H661-1/2

How To Effectively Key Your Bidding And Buying!

Making a successful bid and coming up with an adequate profit is a rare art in these times, but *it can be done* if machine capabilities and job requirements can be closely and accurately matched . . . TROJAN gives you the opportunity to make the most of your own experience and judgment in matching job and machine for maximum profit . . . With 7 machines available in lifting capacities of 7,000 to 24,000 lbs., with bucket options, power options and attachment options; you can key bucket capacity to required power with almost pin-point accuracy . . . There's no need to compromise — no need to buy more or less work capacity than you actually need . . . And, in addition, with every TROJAN you get the tested and proven features of design and construction that permit your operator to tackle the toughest jobs hour after hour, day after day — and complete them safely, swiftly and profitably . . . Most TROJANS sell themselves to hard-boiled buyers at competitive demonstrations against any machine on the market because they are built right, priced right and are 'honeys' to handle . . . Want more details or a field demonstration? Just call your nearest Trojan distributor.



AD NO. 44-57



MODEL 404

LIFTING CAPACITY 24,000 LBS.

MODEL 304

LIFTING CAPACITY 18,000 LBS.



MODEL 254

LIFTING CAPACITY 15,000 LBS.



MODEL 204

LIFTING CAPACITY 12,000 LBS.



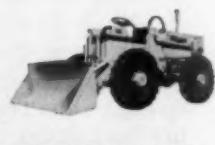
MODEL 164

LIFTING CAPACITY 10,000 LBS.



MODEL 134

LIFTING CAPACITY 8,000 LBS.



MODEL 114

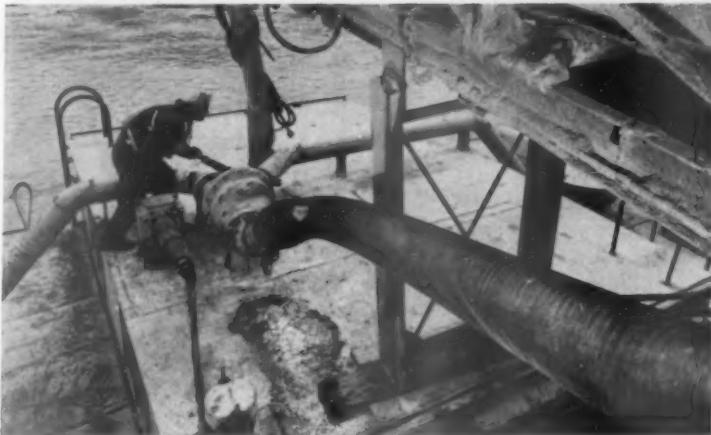
LIFTING CAPACITY 7,000 LBS.

TROJAN®
TRACTOR SHOVELS
YALE & TOWNE

THE YALE & TOWNE MANUFACTURING COMPANY
TROJAN DIVISION • BATAVIA, NEW YORK

Industry News

continued from page 51



Cement blasted at 115 tph. from silos to barge

On the barge docks at Green Bag Cement Co.'s Neville Island plant, an extra-strong, heat-resistant, flexible hose carries cement from storage silos to barges at a rate of 115 tph. The unusual hose, a product called Convertapipe, must stand up under three types of terrific wearing action: pressure reaching 30 psi.; heat as high as 200 deg. inside the pipe; and the abrasion of flying limestone, granulated slag and silica. The hose must be flexible, too, because the barges sink lower in the water as they are filled.

NOTICE

**Rock Products subscribers,
Concrete Products subscribers,
and prospective subscribers**

We have been informed that a Mr. Thomas Kelly has been representing himself illegally as being affiliated with Rock Products or Concrete Products magazines. It is also believed that he may have used the name of Tom Ryan. We've had reports that he sells subscriptions to both magazines.

In the knowledge of the present publisher, this Mr. Kelly is not now, nor never has been, associated with Rock Products magazine or any of its affiliated publications. Under no circumstances should he be given cash or a check for a subscription. If he presents himself as a representative of either magazine, please call us collect immediately at RAndolph 6-2802 in Chicago, Illinois.

Green Bag distribution centers at Marietta, Ohio, and Fairmont, W. Va., are also making extensive use of these Convertapipe installations.

Grand jury indicts eight on price-fixing charge

Accused of raising prices of portland cement, masonry cement and mortar, building lime and other supplies were eight companies in the Washington, D.C., area and six of these companies' executives.

The government claims that approximately \$6.8 million in sales were involved since the "agreements" were started in 1958. This figure comprises about two-thirds of all sales in the area.

Companies named were A. P. Woodson Co., Eckington Building Supply Co., Hudson Supply & Equipment Co., R. Robinson, Inc., Cushwa Brick & Building Supply Co., United Clay Products Co., Potomac Builders Supply Co. and District Building Supply Co. Some members of the Merchants and Manufacturers Association of Washington are alleged to be co-conspirators.

Please turn to page 55



*Just mix
and pour*

NORDBAK

**It's Simple,
Safe and Sure ...**

It had to happen . . . someone was bound to find a way to end the problems of backing manganese crusher parts with molten metal!

Now . . . you can do it with NORDBAK!

It's mixed at "room temperature" and poured right from a can into the crusher cavities. Gone is the need for special melting and pouring equipment . . . and gone are the hazards of pouring hot metal.

An initial, low cost order to back one set of crusher parts will prove the many advantages of NORDBAK . . . call, write or wire your order today!



N281-1/38



NORDBAK
is a
trademark of the
Nordberg Mfg. Co.

NORDBERG MFG. CO.

Milwaukee 1, Wisconsin

OUT WHERE THE JOB IS TOUGHEST... SCANDURA SERVES YOU BEST

Scandura
INC.

PVC CONVEYOR BELTING

Heavy impact, constant abrasive action—rough, tough treatment always! Yet SCANDURA outperforms other conveyor belting by a wide margin in this crushed stone plant . . . pays out in longer life, less maintenance, top fastener holding—thanks to one-piece construction and highest tensile strength below zero or under hottest summer sun. Write for new Scandura brochure!

Scandura
INC.

North Tryon St. at Keswick Ave.
(P. O. Box 949)
Charlotte 1, North Carolina

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Industry News

continued from page 53

Asphaltic concrete reports

The Highway Research Board has published four studies as Bulletin No. 270, Asphalt Characteristics and Asphaltic Concrete Construction. The booklet is available from the Board, 2101 Constitution Ave., N. W., Washington, D.C., at \$1.40.

Contents include: "Effect of Short Asbestos Fibers on Basic Physical Properties of Asphalt Pavement Mixes," by J. H. Kietzman, research engineer, Johns-Manville Research Cen-

What's coming in September

Heavy media systems are growing in importance in the rock products industry. The story of Coast Rock Products' system in the September issue will detail a new installation

ter; "Determination of Age Hardening Tendencies and Water Susceptibility of Paving Asphalt by the Sonic Method," by Franklin P. Abbott and Willis G. Craig, The Lubrizol Corp.; "Rheology of Bitumens and the Parallel Plate Microviscometer," by Paul R. Wood and Herman C. Miller, Naugatuck Chemical Div., U. S. Rubber Co. and "Design and Construction of Epoxy Asphalt Concrete Pavements," by W. C. Simpson, R. L. Griffin, H. J. Sommer, and T. K. Miles, Shell Development Co.

County discovers lower cost in privately crushed rock

Scott County, Iowa, supervisors shut down rock crushing operations at the County's New Liberty plant, finding it more economical to obtain road surface materials under private contract. Le Claire Quarries, Inc., Davenport, purchased its plant and some equipment.



Sloan award cites PCA radio roundup, top safety measure

In 1956, after Tennessee chalked up a record number of highway fatalities, the state district of Portland Cement Association decided to do something about it. Its five-minute "Daily Traffic Safety Report" went on the air, covering daily highway fatalities and comparing records with the previous year's from 5:15 to 5:20, Monday through Friday. In addition, critical holiday weekends are heralded by special appeals from the Governor, Safety Commissioner and other civic officials.

The Alfred P. Sloan Award in recognition of this effective program was presented by Chairman Albert Bradley (left) to John L. Feagin, PCA Tennessee district engineer. The Sloan Radio-TV award climaxed a series of safety contests on all levels under the sponsorship of the National Safety Council.

Mines Bureau canvasses western chemical plants

Chemical producers in California and Nevada are being canvassed by a U. S. Bureau of Mines questionnaire to obtain data on their consumption of non-fuel minerals and metals. The Government hopes the results will prove helpful in economic and defense planning, and the information received also should be valuable to the participating firms.

Please turn to page 58



Just mix
and pour

NORDBAK

It's the modern,
effective way
to back manganese

Non-metallic NORDBAK streamlines crushing operations of every kind. It's as easy to use out in the field as it is in the plant. You mix it and pour it right on the job...wherever your crusher is. No need for special melting or pouring equipment.

NORDBAK fills extremely narrow voids and is only $\frac{1}{4}$ the weight of metallic backing agents. Conveniently packaged, NORDBAK is the one modern, effective backing agent for manganese crusher parts!

You can use NORDBAK in ALL TYPES of crushers, grinding mills and other machinery where backing agents are required.

Call, wire or write your order
for NORDBAK!



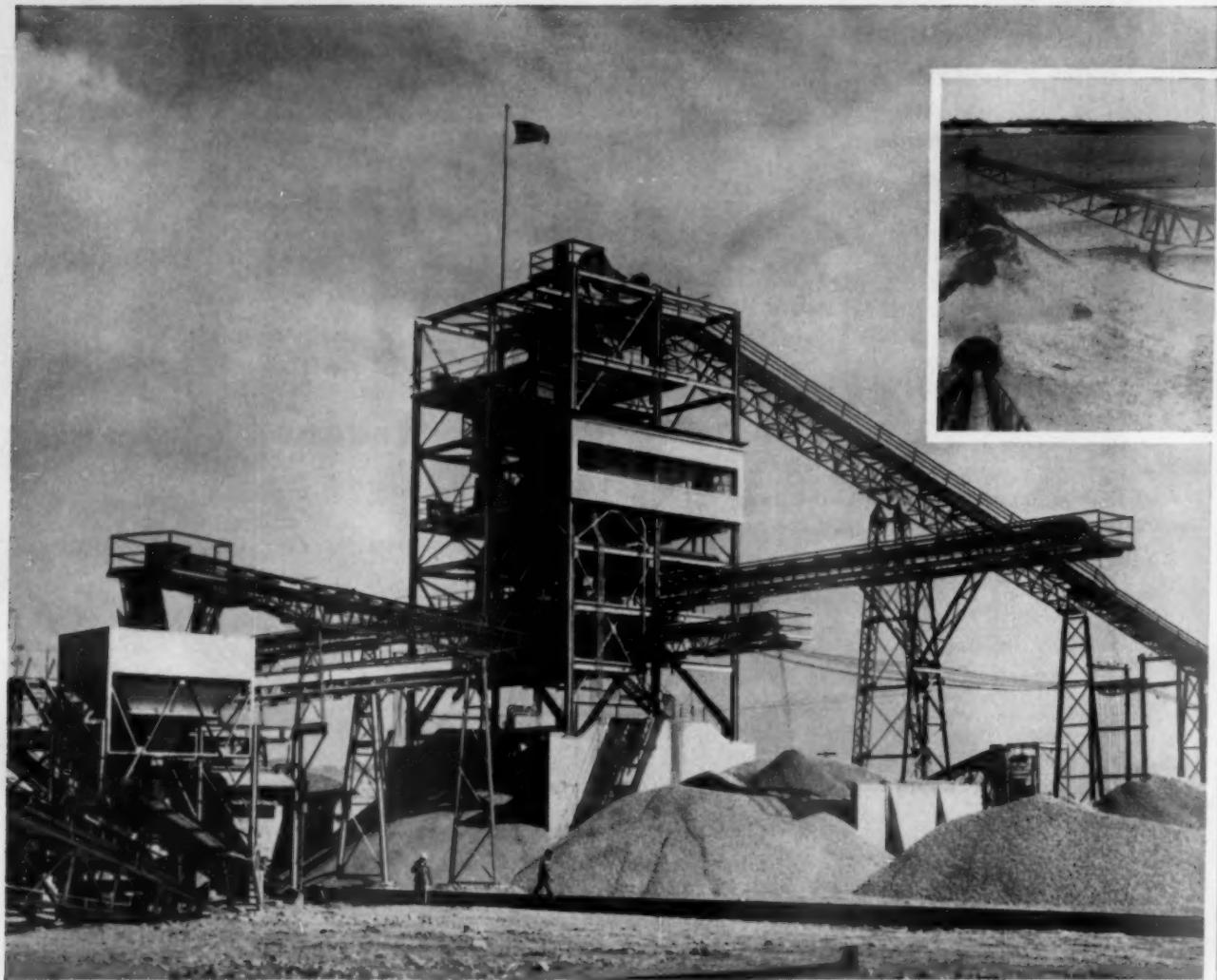
NORDBAK is a trademark of the
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NORDBERG MFG. CO.

Milwaukee 1, Wisconsin

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R381-1/3-R2



MAIN SCREENING TOWER gives exact gradation without guesswork. Any of six sizes of stone plus sand can be reclaimed and blended to rigid specs by pushbutton or manual operation.

PANORAMIC VIEW shows how Barber-Greene conveyors handle material from pit to railroad cars or trucks. Field conveyors are hopper loaded and bring pit-run to primary crusher where 227' fixed stacker builds active surge pile to 6,000 ton capacity. Inclined conveyor under surge pile charges secondary

When plant is on automatic operation, each feeder is started individually and equipment is interlocked to prevent material pile up.

crusher. Any oversize material from first crushing is automatically fed onto parallel return conveyor which feeds back to main conveyor. A 310' inclined conveyor charges main washing and screening plant. Six other conveyors stockpile and reclaim sized materials.





147' RADIAL STACKER stockpiles sand which is then reclaimed to loading-out bins by 346' inclined conveyor originating under stockpile.



120' FIELD CONVEYORS were specifically designed for this plant, each being constructed of rigid truss with only two points of suspension. Each of seven units weighs 9 tons and has two lifting bales that permit fast relocation with shovel that feeds hopper. Conveyors first operated on surface and were loaded by dragline. Units now work in pits and are shovel loaded.



ACTIVE SURGE PILE with 6,000 tons capacity allows independent operation of pit and screening plant. Fixed stacker 277' long builds pile.

AUTOMATED VULCAN CORP. PLANT CUSTOMIZES HUGE OUTPUT

16 Barber-Greene conveyors help give gigantic aggregate supermarket flexibility needed to let customers write own gradation tickets

Here's proof officials of Consumers Co., Division Vulcan Materials Corp., knew exactly what they were doing when selecting a layout for this Crystal Lake, Ill., plant.

- After five years, plant production has increased steadily to present potential of 800 tph. This has been achieved with a layout featuring pit-to-plant conveyor haulage, an interlocked processing flow, a completely independent pit system with the entire operation controlled from just two points.
- Performance of field conveyors, originally selected over haul trucks, causes company officials to comment, "We feel use of field con-

veyors has resulted in considerable saving over truck haulage. Maintenance has been very satisfactory."

Sixteen Barber-Greene belt conveyors totaling 3,367' comprise the material handling system that provides extreme flexibility of operation, fully automatic control and rigid control of gradation. This control lets the customer write his own gradation ticket.

Your Barber-Greene Conveyor Representative can deliver an equally profitable material handling system to your specs when you open new operations or expand old ones. That's what makes his conveyors the overwhelming No. 1 choice of pit and quarry operators.



Your belt conveyor equipment headquarters

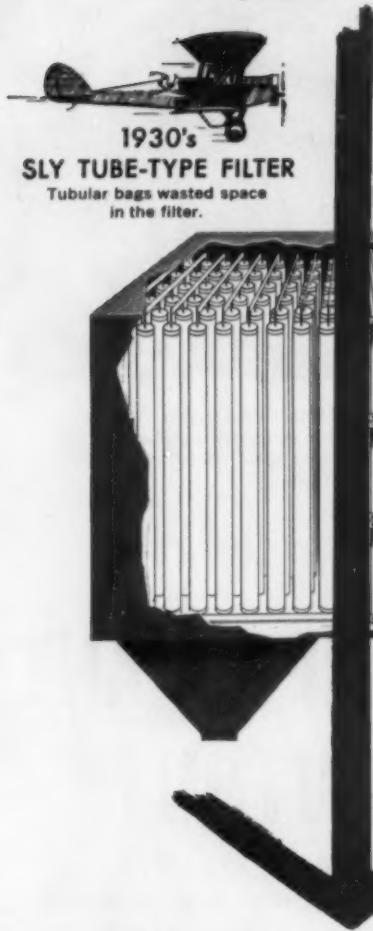


CONVEYORS • LOADERS • DITCHERS • ASPHALT PAVING EQUIPMENT

ROCK PRODUCTS, August, 1961

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**Check the Advantages
of Dynaclone® Dust Filters**



COMPACT DESIGN MEANS 20-40% MORE FILTERING CAPACITY

Modern flat bag design is one reason why Sly outperforms other dust collectors. It provides 20 to 40% more cloth in a given space — greater filtering capacity per cubic foot of filter. The Dynaclone and other Sly Dust Filters fit in where others can't. Yet bags are more easily accessible.

The "Roll-Clean" Dynaclone also operates continuously, provides constant suction at dust sources for complete dust suppression.

It is automatically self-cleaning. The roller cleaner seals off bags one row at a time for cleaning by reverse air. A single exhaust fan provides suction for dust collection and air for cleaning. There are no auxiliary blowers.

And "Resist-O-Wear" bags give 2 to 3 times longer life on the most demanding applications.

Check all the Dynaclone advantages . . . Send for 36-Page Catalog 104.

"Roll-Clean" Dynaclone: Patents 2,867,289, 2,938,598. "Resist-O-Wear" Filter Bags: Patent 2,959,247.

THE W. W. SLY MANUFACTURING CO.

4748 Train Avenue • Cleveland 1, Ohio • Offices in Principal Cities • Overseas Licensees: Andrew Air Conditioning Ltd., London S. W. 1, England • Midco Pty. Ltd., Nunawading, Victoria, Australia

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Industry News

continued from page 55

British celebrate safe year in cement industry

In their fortieth year of active emphasis on accident prevention, British cement companies enjoyed a record low frequency rate of 0.50. Ten factories turned in a report of no lost-time injuries, and over half of the accidents reported were minor cuts and bruises. The three causes furnishing the highest percentages of accidents were: falling objects—17.5 percent; handling objects (including man-propelled vehicles)—15.5 percent; and persons falling—13 percent.

The four most dangerous places to work were in clinker burning—24 percent; preparation of raw materials, clinker grinding, and siding, stores and yard all racked up 13 percent. The safest place to work was in the container (bagging) plant, which provided only 2 percent of the accidents recorded.

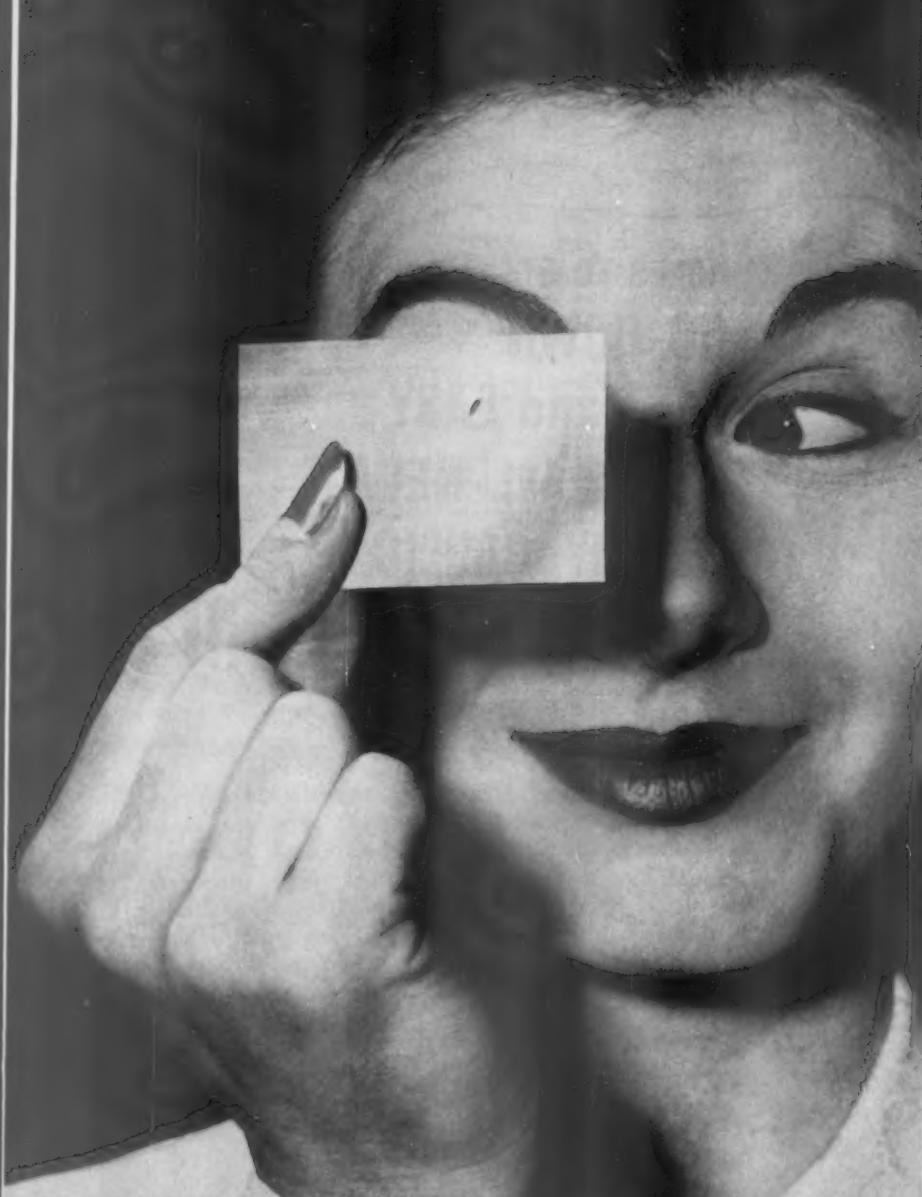
Milwaukee buys, reclaims 18-acre stone quarry

A quarry owned and operated by the Wauwatosa Stone Co. was recently purchased by the city of Milwaukee, Wis., for \$490,000. As soon as blasting and trucking cease, the city will start to dump non-inflammable wastes, and when the quarry is filled the area will be landscaped and developed.

Century-old stone plant sold

The stone plant and facilities of Scioto Lime and Stone Co., Delaware, Ohio, have been sold to National Lime and Stone Co., of Findlay. Scioto has been owned and operated by the Reaney family since 1860. Current president Warford Reaney will continue in charge under a leasing arrangement.

Please turn to page 61



Wire cloth so finely woven it screens out light!

Openings in this woven wire cloth are so tiny they're specified in microns—millionths of an inch. This is Tyler stainless steel wire cloth, 325 x 2300 mesh, used in filtering fuel in aircraft engines. Whatever your special needs in wire cloth, Tyler can supply you from the world's broadest line—covering thousands of different specifications.

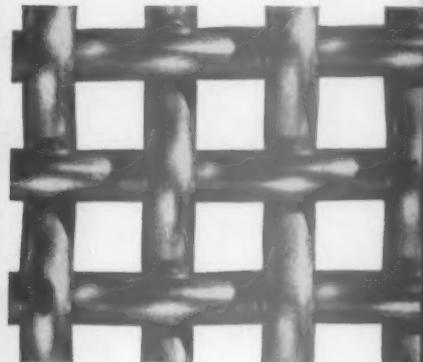
TYLER CUTS YOUR COST OF SCREENING

- Requirements matched from world's broadest line of wire cloth
- Fast shipments from the industry's largest inventory
- Technical service backed by unique Customer Service Laboratory.

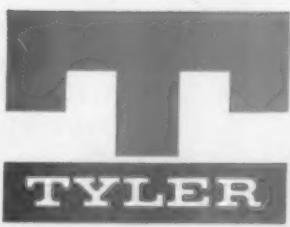
THE W. S. TYLER COMPANY Cleveland 14, Ohio • OFFICES: Atlanta • Boston • Chicago • Dallas • Los Angeles • New York • Philadelphia • Pittsburgh • Salt Lake City • San Francisco • The W. S. Tyler Company of Canada, Limited, St. Catharines, Ontario • OFFICE: Montreal

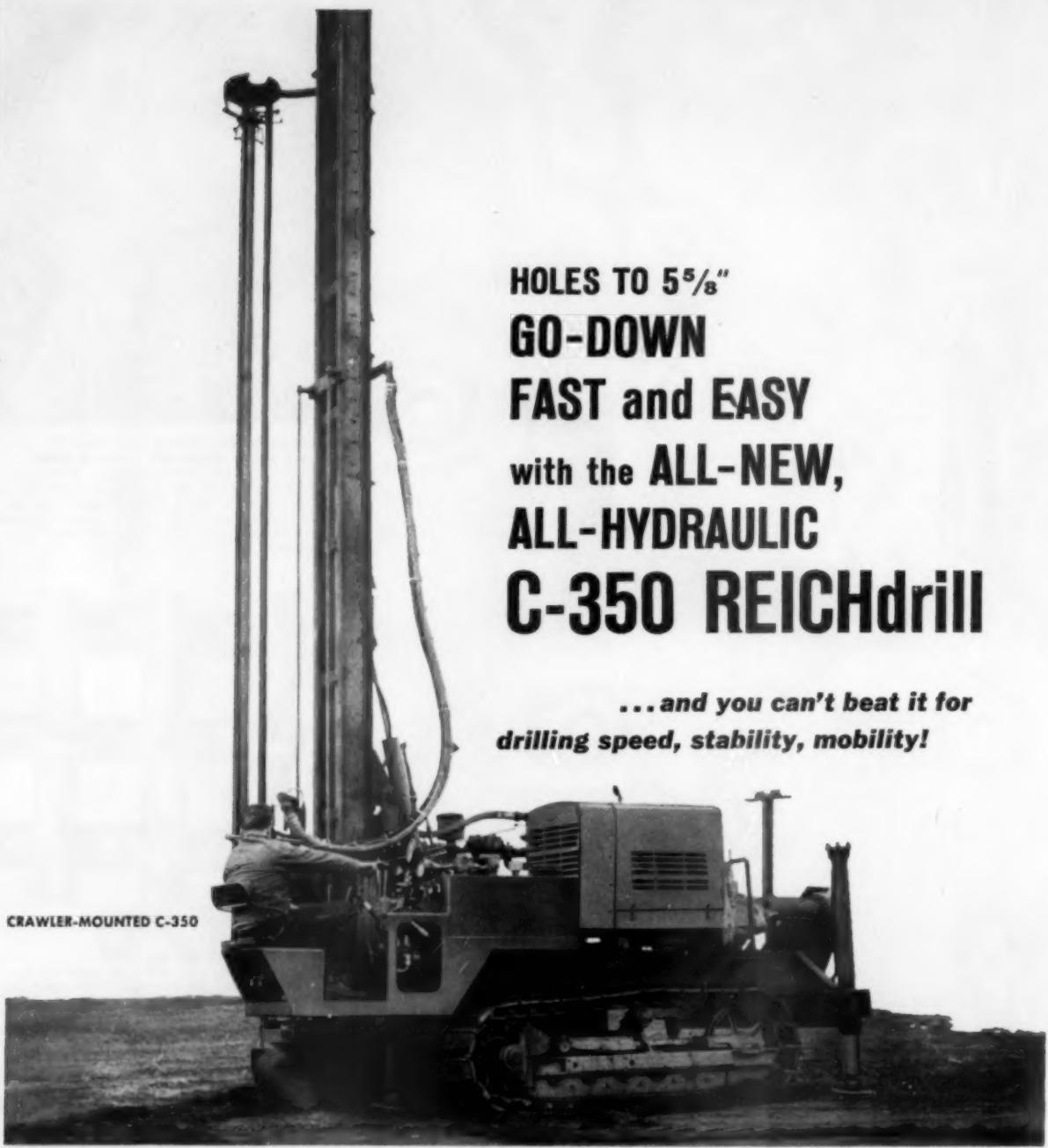


FABRICATED SCREEN SECTIONS TO FIT EVERY VIBRATING SCREEN MADE
Tyler fabricates screen sections to fit every existing type of vibrating screen. This aggregate cloth is drawn from inventory, quickly fabricated to give you fast delivery. Tyler-developed hook strips maintain drum-head tension for long service life.



HEAVY TONNAGE SCREENS
Tyler offers a selection of mesh designs and abrasion resistant alloys to match the requirements of any application in mining and aggregate industries. Check Tyler for technical recommendations.





CRAWLER-MOUNTED C-350

HOLES TO 5^{5/8}"
GO-DOWN
FAST and EASY
with the **ALL-NEW,**
ALL-HYDRAULIC
C-350 REICHdrill

*...and you can't beat it for
drilling speed, stability, mobility!*

NOMINAL HOLE SIZE—1^{1/8}" to 5^{5/8}" • DOWN PRESSURE—10,000 LBS. • ROTARY SPEED to 540 RPM

Easy Operation is assured by all-hydraulic, labor-saving controls. *Stability* is provided by 14" wide tracks, low center of gravity and 8'8" wide frame plus 3 REICH heavy-duty hydraulic leveling jacks. *Mobility* is high because the crawler-mounted 350 trams at 7.8 MPH; climbs 25% grades, turns in its own length. *Versatility* is basic in REICHdrill design. The 350 is at home blastholing with 3-cone rotary bits, In-Hole Drills, or drag bits; and whether coring or prospecting.

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60

A truck-mounted T-350 REICHdrill for greater mobility with all the above advantages, is also available. Get detailed specifications.

Ask for SP-5001-2



Industry News

continued from page 58

American-Marietta and Martin talk merger

Officials of American-Marietta Co. and the Martin Co. have been planning a merger, and will call for a shareholders' vote in the near future.

This marks the second time in recent months that a large aircraft-electronics manufacturer has taken over one of the giants in the rock products industry. A few months ago General Dynamics bought out Material Service Corp., Chicago-based aggregates producer.

Although originated as an aircraft company, Martin is now concentrating on missiles, electronics, nuclear energy and space vehicles. Last year its net income amounted to over \$16 million on sales of \$651 million.

George M. Bunker, chairman of Martin, will serve as chairman and president of the new company, and American-Marietta chairman, Grover M. Hermann, will be vice chairman. In announcing the proposed consolidation, the officials said, "It is anticipated that the new company will be in a position to serve better its Government and military customers as well as those in areas essential to the construction industry and the general civilian economy."

Potash shaft sunk 3,000 ft. using European methods

International Minerals & Chemical Corp. Ltd., is tapping huge potash reserves 3,150 ft. under the earth's surface. To accomplish this, it has resorted to a freezing and tubing technique which is new to this hemisphere, although it has been frequently employed in Europe. Associated Mining Construction Ltd., composed of four German shaft-sinking companies, is the specialist involved.

At Esterhazy, Saskatchewan, work began last fall by consolidating the entire Blairmore stratum, source of the mining difficulties, for an area extending 50 ft. around the center of the shaft. Fifty-eight 250-ft. freeze pipes were sunk in a circle around the shaft and lithium chloride brine was run through them at minus 58 deg. F.

Then pavement breakers took over the task of actually sinking the shaft. Every five feet a sealed ring of tubing was installed. Then, the Blairmore stratum itself was walled off by a 350-ft. cast iron lining, weighing 3,000 tons.

A pilot surface plant capable of a 420,000-ton annual production is standing, and plans are being made to double its present capacity.

Highway user taxes rose in 1960

A record total of \$5.3 billion in state highway user taxes was collected last year, according to Federal Highway Administration statistics. This represents an increase of 4.5 percent over 1959, and a consumption of 64.8 billion gal. of motor fuel.

Here are amounts, grouped in major classes.

	1960 (millions)	1959 (millions)
Motor fuel taxes (net adjusted)	\$3,396	\$3,265
Motor vehicle registration fees	1,513	1,449
Other motor vehicle and carrier fees	411	377

These were the seven top states in gallonage taxed and in motor vehicle registrations:

	Gallonage taxed (billions)	Vehicles registered (millions)
California	5.7	7.8
Texas	3.7	4.5
New York	3.6	5.1
Pennsylvania	3.3	4.3
Ohio	3.1	4.1
Illinois	2.9	3.8
Michigan	2.5	3.3

Please turn to page 63

GOT A WELDING PROBLEM?



on the following pages

READ...

1 How McKay 11018 Electrodes meet the need for high tensile and yield strengths at Material Service Corporation in helping make stronger dipper sticks.

2 Why McKay Hardalloy 44 is the ideal Electrode for overlaying carbon steel and austenitic manganese steel parts, subjected to heavy impact and severe abrasion.



404 MCKAY BLDG. • PITTSBURGH 22, PA.

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MEETS ALL SPECS ...IN A SINGLE PLANT

● Processing hard trap rock, this plant makes all Delaware and Maryland Highway specification sizes, as well as producing all required sizes for general construction. Plant has a cleancut straight line layout and is Telsmith equipped. As designed, the plant has unusual flexibility—a large primary surge pile; 4 stages of crushing; 3 stages of bins and screening: for modified sizes . . . for large sizes . . . and a dual tertiary stage for fine sizes. Designed for a maximum capacity of 2500 tons daily, the plant, near North East, Md., is owned by Maryland Materials, Inc., formed by Petrillo Bros., well known aggregate producers, and James Julian, Inc., prominent contractors of Wilmington, Del.



No. 1 bin with 5' x 12' double deck Scalper and 13-B Gyratory Crusher



No. 2 bin with 5' x 14' triple deck Vibro-King Screen, 48-S Gyrasphere Crusher



No. 3—two 3-compartment bins with a 48-FC Gyrasphere Crusher

TELSMITH Equipment in this plant—48" x 16' heavy duty Apron Feeder • 36" x 6' heavy duty Plate Feeder • 5' x 12' double deck Scalper • 13-B Gyratory Crusher • 5' x 14' triple deck Vibro-King Screen • 48-S Gyrasphere Crusher • two 4' x 14' triple deck Vibro-King Screens • 48-FC Gyrasphere Crusher • two 36" x 72", 36" x 132", 30" x 130", 24" x 126", 24" x 74' Telsmith Barber-Greene conveyors.

Send for Bulletin 266

Q-41-261



SMITH ENGINEERING WORKS

508 E. CAPITOL DRIVE, MILWAUKEE 1, WISCONSIN

Cable Address: Songworks, Milwaukee • Representatives in Principal Cities in all Parts of the World

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DIVISION OF
Barber-Greene

Industry News

continued from page 61

Pre-blended cement allows mortar quality control

A new high-speed process blends cement, sand, lime, bonding, waterproofing and plasticity materials into Instant Crete, a product that is delivered bagged to the site, ready-to-use with the addition of water.

Mortar has always been difficult to standardize, and archi-

What's coming in September

Maintenance efficiency will be the keynote of the September issue of Rock Products. Manufacturer's maintenance training schools will be one feature you won't want to miss.

tects and contractors could never be sure that their specifications with regard to it were being met by the laborers. Instant Crete provides a good measure of quality control, economy—both of materials and labor, and even a choice of color. It is said to be so much easier to use than conventional hand-mixed products that masons will be able to lay about 25 percent more bricks per hr.

1960 was good cement year for Austria

Austria's cement industry increased production in 1960 by 14 percent to 2.8 million tons.

In spite of rising wages and material costs, producers are striving to keep their prices steady throughout this year.

New NSGA Blue Book is ready

The National Sand & Gravel Association has put out a new edition of its Blue Book on Percentage Depletion. Managing Director Vincent P. Ahearn warns

that the whole problem of percentage depletion—including whether or not it should be outlawed—will come up before Congress not later than next year, "and our industry should be prepared to show, as I think we can, that percentage depletion for sand and gravel serves the public interest."

Due to anticipated demand, member companies will receive one additional copy free; any others may be ordered at \$1 each.

Here's a masonry cement for arid climates

Aridzone Masonry Cement is a new development of Phoenix Cement Co., designed especially to withstand the hot, dry atmosphere of Arizona. The state is one of the leading users of concrete block and, as more than 70 percent of all brick and concrete block units are built with the use of masonry cement, considerable demand for the product is anticipated.

Israel's phosphate business to get big boost

Phosphates are Israel's second largest mineral resource, but until now the deposits have not been paying off. However, under a master plan prepared by the government-controlled Negev Phosphate Co., the industry is switching from the exporting of rock to the sale of finished phosphate products.

This plan provides for an annual production of 200,000 tons of calcinated phosphates and 140,000 tons of phosphoric fertilizer and animal foodstuff additives. A future plant may be added, which would produce soda ash at a rate of 60,000 tons per year.

Please turn to page 65

MCKAY 11018 ELECTRODES

1



... help make a stronger dipper stick in welding T-1 steel

"McKay 11018 Electrodes and T-1 steel were combined to produce a shovel dipper stick in our shop at substantial savings," said Mr. Ernest Escobar, foreman of the welding division of Material Service Corporation. "This dip stick should outlast the shovel."

Material Service operates plants and quarries throughout the nation, producing sand, gravel, limestone rock and agricultural lime. The Lockport shops are responsible for maintenance and repair of all barges, locomotives, earth-moving machines, cranes, dredging equipment and freight cars.

The McKay Company's full range of Electrodes and Welding Wires meet the widely diversified requirements of the Material Service Corporation.

Whatever your electrode needs may be; for mild or stainless steel fabrications or hard surfacing applications, it pays to investigate McKay.

WRITE FOR new catalog on the "Welding of Mild Steels." It catalogs specifications, operating characteristics, properties, uses other data about McKay Mild Steel, Low Alloy & Low Hydrogen Electrodes.



THE
MCKAY
COMPANY

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TERRIFIC!

**— and how long will the
flexing member last?**

Good question. The heart of Para-flex is a tire with synthetic tension members bonded together in rubber—which provides a flexing body that automatically compensates for all combinations of misalignment and end float, and absorbs vibration as well!

This amazing coupling has now been used in American industry 4 years. Thousands are in operation—in steel mills, paper mills, oil fields, mines, quarries, chemical plants, everywhere—and in these 4 years, replacements of elements have been negligible.

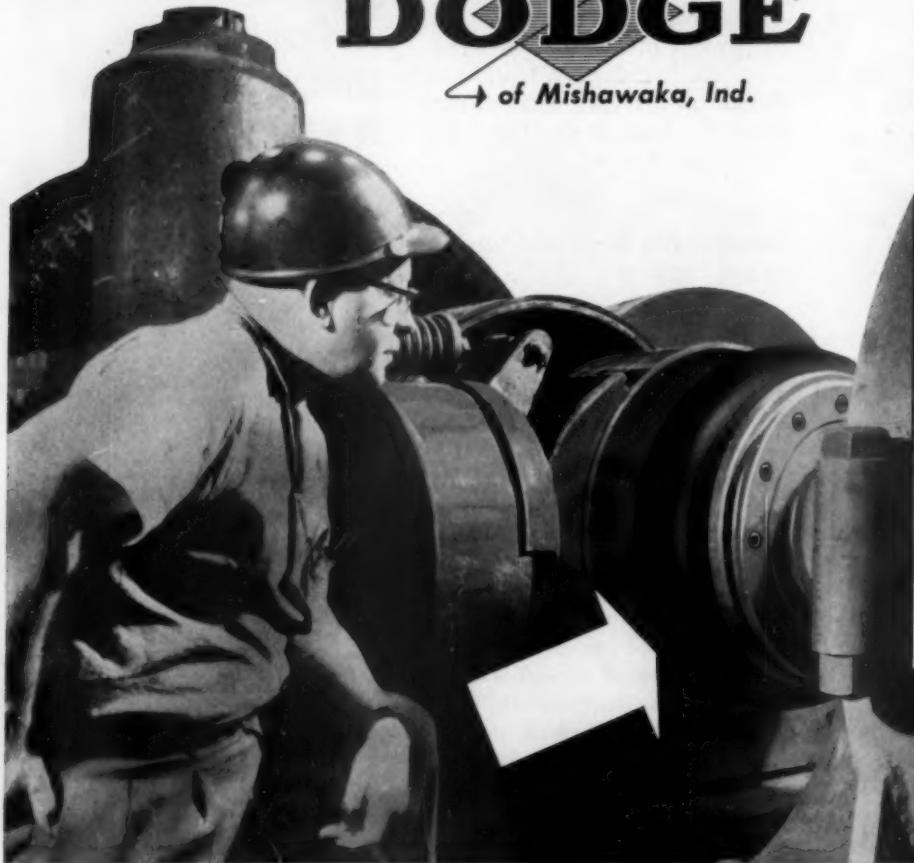
Dodge Standard Para-flex takes angular misalignment up to 4°, parallel misalignment up to $\frac{1}{8}$ " and end float up to $\frac{5}{16}$ " depending upon the size of the coupling and the duration of shaft displacement.

Dodge Para-flex is available in 3 types—Standard, Flywheel and High Speed (shown at right). The Standard type is stocked in capacities up to 3640 hp at 910 rpm. Ask your Dodge Distributor, or write us for complete technical bulletin.

Dodge Manufacturing Corporation, 2600 Union Street, Mishawaka, Indiana

The Products with the Pluses...

DODGE
→ of Mishawaka, Ind.



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The new idea in flexible cushion couplings, with a flexing member that "swallows up" misalignment.



No lubrication, no maintenance. Replace flexing element without moving driver or driven machine.



Flywheel and High Speed Types. For use with motors and internal combustion engines turning up to 5230 rpm.

DODGE
Para·flex



CALL THE TRANSMISSIONEER,
your Dodge Distributor.
Look under "Dodge Transmissioneers" in the white
pages of your phone book.
Factory trained he can give
you valuable assistance.

Industry News

continued from page 63

Largest sandstone producer changes hands

Cleveland Quarries Co., South Amherst, Ohio, famous during its 75 years as the producer of "Amherst Sandstone" and at present the world's largest sandstone operation, has been acquired by Cleveland Builders Supply Co., Cleveland. The same management and personnel will run it as a separate enterprise.

Cleveland Builders supplies brick and masonry products from 13 plants, seven warehouses and a dock, all located in the area. The sandstone will supplement these products. At present, Cleveland Quarries and its subsidiary, Silica Chemicals, Inc., employ about 300.

Here's a "package" to protect, insulate, soundproof

In a cooperative marketing effort, two Colorado-based firms have joined forces and products into a "package" designed to meet special needs in insulation, fire protection, soundproofing.

Insuplast, Inc., of Canon City, is contributing Insuplast, an insulation material, and Acoustiplast, a shield against fire, sound and temperature. American Kylon Corp., Denver, is adding its decorative spray-on sound conditioner Qui-ett.

Used in various specified combinations, the materials will resist temperatures as high as 2,000 deg. F. under a steady flame for four hours and cut sound by half, as well as insulate against both heat and cold. They will bond to wallboard, wood, metal and glass. Company officials predict use of their "package" should substantially lower insurance rates.

To meet the increased production demands, Insuplast, Inc., plans a \$500,000-expansion of its vermiculite plant at Canon City.

Toronto firm expands

Consolidated Sand & Gravel Ltd., Toronto, subsidiary of Standard Paving & Materials Ltd., purchased the Malton, Ont., plant of Commercial Sand & Gravel Ltd. Consolidated is also building a crushed stone plant at its quarry north of Malton.

Noon-hour blast demolishes cement plant building

Four workers were killed and several critically injured when an explosion, believed to be caused by accumulated natural gas, blew up a new shipping building at Lehigh Portland Cement Co.'s Mitchell, Ind., plant.

It was fortunate that the accident took place during lunch hour, as in 10 minutes the full crew of 24 would have resumed work on the building. Onlookers described the tremendous blast as "deafening;" concrete, steel and workers flew through the air, and the 150 x 60-ft. structure was completely wrecked.

\$25 million phosphate works underway in Algeria

Northeastern Algeria contains a phosphate deposit of 500 million tons. Construction has begun on a \$25 million enterprise, the Djebel-Onk works, which should be in production by the end of next year. By 1964, the works will be producing 800,000 tons annually.

The Compagnie des Phosphates de Constantine is major shareholder in the new project; the remaining shares are held by the French government and Algerian interests. Plans include a \$8 million treatment plant at Bone, on the Mediterranean, which will be linked with the mines by a \$9 million electric railroad.

END

MCKAY Hardalloy 44 HARD SURFACING ELECTRODE

2



withstands heavy impact and severe abrasion in a variety of uses

Bucket edges and teeth hard surfaced with McKay Hardalloy 44 Electrodes resist abrasion far better and wear longer than the original surfaces. This has been proved time and again, not only for bucket edges and teeth but for ditcher rollers, crusher rolls and similar equipment.

McKay Hardalloy 44 is an all-position Electrode with excellent arc action, low spatter loss and little slag. Due to the low hydrogen coating and closely controlled alloy balance, Hardalloy 44 deposits provide the best combination of impact and abrasion resistance.

Hardalloy 44 bonds well to both carbon steel and 12-14% manganese steel. Deposits are not machinable. They are sound and smooth and require but a minimum of grinding.

WRITE FOR Hardalloy 44 Data Sheet. Contains full details on the operational characteristics, physical properties, and weld metal composition. Specific applications are included.

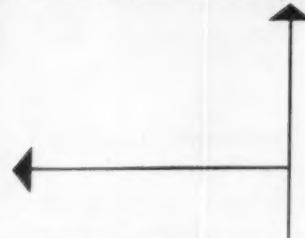


M-6

THE
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COMPANY

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65



Whichever they have to load, truck or gondola, McDonough's 4½ yd Michigans do the job fast. Typical 12 yd semi takes 1 to 1½ minutes, 70 ton railroad car five minutes or less.

Sister quarries share Michigan Tractor Shovel fleet, report

6 machines do the work of 12

At McDonough Brothers' two quarries near San Antonio, Texas, six Michigan Tractor Shovels are doing the material handling normally assigned a fleet of loaders *and dozers* at least twice as big.

Power, speed, and capacity of their five 262 hp 4½ yd Model 275A Michigans take care of all the heavy work (except shot rock loading) at both quarries, both crushers, and at

an adjacent 7500 lb continuous-mix bituminous plant . . . while a smaller 1¼ yd Model 75A stockpile-loads the 4 and 6 yd trucks and handles scattered odd jobs.

All told, the Michigans regularly handle eight major jobs:

- Load all trucks hauling stockpiled materials produced by both crushing plants . . . twenty-four or more separate stockpiles.

- Dress all stockpiles.
- Load one-third of all 70 ton railroad gondola cars at both plants.
- Replace donkey engines for moving and spotting gondolas.
- Load all trucks hauling aggregates and sand to charge the bituminous plant.
- Truck-load finished bituminous materials.

- Clean quarry floors after blastings and push shots up to the heavy rock shovels for loading.
- Maintain all haul roads in all plant areas.

Michigans load in record time, get job assignments by 2-way radio

Loading time on all these assignments has proved exceptionally fast. A typical 12 yd semi is loaded in only 3 passes of a Model 275A's 4½ yd bucket and an average of 72 seconds. A typical 70 ton gondola car is loaded in 5 minutes or less.

Two-way radios help save time too. As a haul unit enters either McDonough yard, the central control station located at the scale house radios the Michigan working nearest the required stockpile. Over the Michigan drives, fast as the truck. Time is also saved by radio-directing the speedy Michigans to other assignments over the one-half mile radius between the two quarries. With this system, maximum production is maintained . . . idle machine time virtually eliminated.

Dependability a prime reason why McDonough Brothers prefer Michigans

McDonough Brothers purchased their first Michigan five years ago—

In addition to loading and stockpiling, Michigans perform other quarry jobs such as floor cleanup, haul road maintenance and switching of 70 ton gondola cars.



Two new 25-ton Michigan Model 210 Tractor Wagons have also been recently added to McDonough Brothers' Michigan equipment spread. Replacing several large tandem-dump trucks, the rear dump Michigans haul aggregates from hopper to assorted stockpiles up to 3,000 feet distant . . . and feed the bituminous plant when it is operating. Occasionally, too, the hefty 31.4 mph units fill in as shot rock haulers when one of the rock hauling trucks is down for repairs.

a Model 175A with 2½ yd bucket. Three years, and over 10,000 meter hours later, it was traded for a larger Model 275A. Then expanding operations, combined with Michigan's excellent performance, caused the addition of four more Model 275A Michigans and one Model 75A to bring the fleet up to present strength.

Typical of the performance turned in by the Michigans today is an hourmeter reading taken at random from one Model 275A. In 17 months of operation, it showed 4,915 hours—an average of 66.4 hours worked each week since purchase.

Co-owners Jim, Dan and John McDonough are completely satisfied with their Michigan units. "Michigan Tractor Shovels have proven highly successful in our

quarry operations," reports Jim McDonough, "And we like the dealer service organization (Waukesha Sales & Service, Inc., San Antonio, Texas) behind them."

Demonstrate? Glad to!

Your Michigan Distributor will be glad to demonstrate a Michigan Tractor Shovel on your job at no obligation. Call him and select the size that best fits your operations . . . nine models . . . with lift capacities from 3,000 to 29,000 lbs.

Michigan is a registered trademark of
CLARK EQUIPMENT COMPANY
Construction Machinery Division

CLARK EQUIPMENT
2481 Pipestone Road
Benton Harbor 2, Michigan
In Canada: Canadian Clark, Ltd.
St. Thomas, Ontario

**The BEST
by TEST!**



**The New Long Lasting
Heat Treated**

CAPE ANALLOY DROP BALL

The "Cape Ann" FORGED Steel Drop Ball is noted for its long life and better wearing qualities for use in secondary breakage!

Extremely tough and abrasion resistant "Cape Ann" Drop Balls are Sonic Tested before shipment and are fully guaranteed.

2000 - 12000 lbs.

**CAPE ANN
ANCHOR & FORGE CO.
P. O. BOX 361
GLOUCESTER, MASSACHUSETTS**

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CALENDAR

of coming events

1961

August 20-24, 1961—National Sand & Gravel Association and National Ready Mixed Concrete Association, Board of Directors' Semi-Annual Meeting, The Greenbrier, White Sulphur Springs, W. Va.

September 10-13, 1961—American Mining Congress, Metal Mining & Industrial Minerals Convention, Seattle, Wash.

October 2-3, 1961—Canadian Institute of Mining & Metallurgy and the Society of Mining Engineers of the American Institute of Mining, Metallurgical & Petroleum Engineers, Joint Meeting of Industrial Minerals Divisions, Ottawa, Ontario, Canada

October 4-5, 1961—National Slag Association, Annual Meeting, Pocono Manor Inn, Pocono Manor, Pa.

October 5-6, 1961—National Lime Association, Operating Meeting, Shoreham Hotel, Washington, D.C.

October 16-21, 1961—National Safety Council, Annual Convention, Conrad Hilton Hotel, Chicago, Ill.

1962

January 15-19, 1962—National Limestone Institute, Inc., Meetings, Roney Plaza Hotel, Miami Beach, Fla.

February 4-8, 1962—American Society for Testing Materials, Committee Week, Statler-Hilton Hotel, Dallas, Texas

February 5-9, 1962—National Sand and Gravel Association—National Ready Mixed Concrete Association, 32nd Annual Convention and Biennial Show, Conrad Hilton Hotel, Chicago, Ill.

February 11-15, 1962—National Crushed Stone Association, Annual Meeting & Exhibition, Conrad Hilton Hotel, Chicago, Ill.

April 3-5, 1962—American Institute of Electrical Engineers, Cement Industry Technical Conference, Chase Hotel, St. Louis, Mo.

June 24-29, 1962—American Society for Testing Materials, Annual Meeting, Statler Hotel, New York, N.Y.

HOW WESTERN GEAR SERVES THE CEMENT INDUSTRY

The Hawaiian Cement Industry is GEARED TO GROW by Western Gear

TWO GIANT STRIDES in the recent growth of the cement industry in Hawaii are shown here in the two newly completed high-capacity modern cement plants. One at Waianae, Oahu, was built for the Permanente Cement Company by Kaiser Engineers. The other at Barber's Point, Oahu, was engineered by the Bechtel Corporation for the Hawaiian Cement Company. Both have one important productive force in common. Both plants are geared to produce with maximum speed, capacity and efficiency with Western Gear Speed Master cement mill drives, speed reducers and gear motors. Check your plant power transmission requirements with Western Gear. For full particulars on how your company can be Geared To Grow, or for product catalogs—address **Western Gear Corporation, Industrial Products Division, P.O. Box 126, Belmont, Calif.** • LYtel 3-7611.

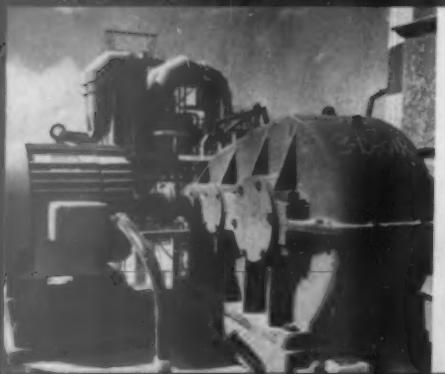


on the long run... QUALITY COSTS YOU LESS!

SpeedMaster speed reducer ahead of bucket elevator carrying raw feed to kiln.

StraitLine gearmotors driving screw conveyors which withdraw and blend finish cement.

StraitLine gearmotors driving screw conveyors at blending and homogenizing silos.



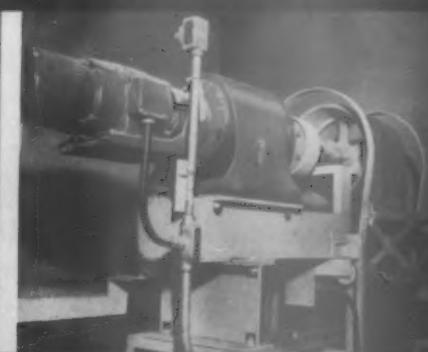
StraitLine gearmotor screw conveyor drive installed on top of raw materials silo.



SpeedMaster reducer induced draft fan drive at the rear of the precipitator.



StraitLine gearmotor manlift drive.



A PRODUCT OF CHRYSLER CORPORATION

TOUGHEN YOUR FLEET WITH DODGE HEAVY-DUTIES

Dodge heavy-duty trucks for 1961 are the toughest, stingiest, workingest trucks we've ever built. Engines have been improved, beefed up all 'round. There's V8 gasoline muscle to 228 H.P., and Cummins diesel muscle to 743 cu. in. and 220 H.P. Frames, clutches, transmissions and axles have been strengthened to match. Swing-out fenders let you walk right up to the engine and service it fast. A BBC of 89 $\frac{3}{4}$ " lets you put more load on less wheelbase, or pull a longer trailer. Those are two advantages of Dodge's cab forward design. Another: the cab simply can't go haywire, nor do you have to raise the roof to accommodate it. If you own a tilt-cab, you'll know what we mean. Toughen your fleet from a big choice of Dodge heavies. Trucks and tractors. GVWs from 19,500 lbs. to 53,000 lbs. GCWs to 76,800 lbs. Two other things to think about. The heavy-duty Dodge for your job is probably waiting your order today at a Dodge Truck Center. And now there's a 24-hour-a-day, seven-day-a-week ordering system for emergency parts. Delivery's soonest!

DODGE BUILDS TOUGH TRUCKS



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ROCK PRODUCTS, August, 1961

HINTS & HELPS

Profit-making ideas developed by operating men



Loading setup

A Southern crushed stone producer has found that four stockpiles can handle the large majority of orders for blended materials. However, every once in awhile it is necessary to put another size into the system.

This is done with an auxiliary loading hopper that has a ramp to give access to a front end loader. The hopper is large enough to handle the loader's bucket, and the bottom is fitted with a slide gate to adjust the flow of material to the belt that carries the additional size to the main stream of the system.

Clean blinded screen cloths

Aggregate producers who have screen blinding problems only occasionally have discovered that once the cloths have plugged up, it is almost impossible to clear them. An eastern slag producer who is also in the sand and gravel business has discovered that

sandblasting is an effective way of reclaiming screen cloth. The cost of cleaning a solidly plugged cloth has proven to be much less than the cost of purchasing a new cloth—particularly when a brand new screen is involved.

How to get to the other side of the road



Aggregates are not always in exactly the right place for easy production. This is especially true in the far west, where mountains and rivers stand between many a rich deposit and the job site.

Here, the swift-moving torrent of the Snake River prevented the use of barges or the construction of a truck bridge. But the ingenious aggregates contractor built a long suspension bridge for a 30-in. wide belt conveyor.

The bridge is over 900 ft. long with access walkways on each side of the belt conveyor. Before the bridge is dismantled, it will have handled more than 500,000 tons of gravel from a processing plant on the south bank to a concrete batching plant on the north bank of the river.

Radio monitors power system

A radio sending-and-receiving circuit provides a fail-safe system for remote protection of a high-voltage power cable. An asbestos mine in Quebec has installed what may well be the very first of its kind.

A small, very high frequency radio transmitter takes its energy through ground detector relays in a 2,300-v. circuit supplying a shovel in the open pit. Any break in this circuit or in the 440-v. system in the shovel will interrupt the continuous signal.

The receiver is mounted more than 1,000 ft. away in the oil circuit-breaker house. Here, a set of relays opens the circuit breakers and interrupts the power supply to the ground fault. Since the transmitter operates on the 150 megacycle band, it cannot interfere with radio or TV reception in the area.

Truck-loading chute

A western sand producer has so little coarse gravel in his deposit that he felt a separate gravel bin would be an unnecessary expense. When the conveyor system is operating, he stations a small truck under a transfer chute fitted with a bar grid that strips out all plus 2-in. gravel. At the end of the day, the truck is driven away to dump the gravel. Of course, the chute is arranged to fold back into the hopper and to retain oversize in the conveyor system.

END



We've put a bulletproof vest on our bullet (It ends lead build-up in our kiln gun)

This bulletproof vest is made of cardboard. It's a wax-impregnated wrap that we placed around the lead slug of Western's Industrial Ammunition to keep the slug from coming in contact with the kiln gun barrel and muffler. Because of it, lead build-up is no longer a possible troublemaker. And along with Western's cup-wad seal, the bulletproof vest contributes to the virtual elimination of blow-by. (But it's added nothing to the price.)

One Ramset Ringblaster kiln gun in use at one of the world's largest cement plants has so far fired over 250,000

rounds of Western Industrial Ammunition without any trace of lead build-up. Or any other maintenance problems for that matter.

Together, the Ramset Ringblaster and Western shells comprise a system for keeping kilns clear of obstructions. A fast, economic, efficient system. And now they've been engineered to keep themselves clear of obstructions.

For more information on the Ringblaster kiln gun and the line of Western Industrial shells, write to Ramset.

Ramset

Clin

Enter 1025 on Reader Card

304-H Winchester Ave., New Haven 4, Conn. WINCHESTER-WESTERN DIVISION

ROCK PRODUCTS, August, 1961



**As the Dolomite Company knows so well . . .
hauling profits depend on the**

RIGHT TRUCK ON EVERY JOB

Dolomite Products Co., Inc., Rochester, N. Y., avoids profit-squeezing hauling costs because it has the know-how and experience to analyze its truck needs with an eye to keeping costs under strict control. Loads, terrain, schedules, climate, speeds, etc., all must be carefully weighed in selecting trucks for best all-round performance. For twenty years, Dolomite has been developing the use of Mack trucks in a wide variety of assignments . . . keeping its large and diversified operation rolling smoothly, profitably.

In the quarrying phase of Dolomite's operation, for example, Mack B-813 Models, hauling

double-bottom side-dumpers, team up with fast shovels to deliver four to five thousand tons of dolomite rock to the crusher each shift.

Modern efficient high-volume operations like those of Dolomite depend on modern efficient equipment to keep operating costs low. Macks, like the B-813's used in this quarry operation, contribute to high efficiency because of their outstanding performance characteristics. The Mack Turbocharged Thermodyne® engines provide plenty of power for fast get-aways under full loads. Massive self-equalizing brakes and easy, positive power steering assure safe, fast maneuverability at shovel and crusher. Traditional



UNDER THE SHOVEL—Fast cycle time with big loads is needed in quarry work. Dolomite puts big Mack double-bottom side dumpers on this assignment.



AT THE CRUSHER—Turbocharged Thermodyne diesel-powered Mack side-dumper empties quickly at the crusher as another big load pulls into position behind it. These units operate on only 20 gal. of fuel per 9 hr. shift.

Mack construction throughout reduces down-time and maintenance.

These are sound reasons why Macks are first choice where profitable operations rely on truck performance . . . why a Mack will pay for itself again and again by delivering top work capability per dollar invested. Your Mack representative is qualified by knowledge and experience to help you determine the Mack model that will provide the most economical solution to your trucking problem. Mack Trucks, Inc., Plainfield, New Jersey. Mack Trucks of Canada, Ltd., Toronto, Ontario.

FOR STOCKPILING—Crushed stone rolls to stockpile on Mack B-42T combinations. Manitou Construction Co., a division of Dolomite Products Co., Inc., also uses these vehicles to handle material for paving jobs.

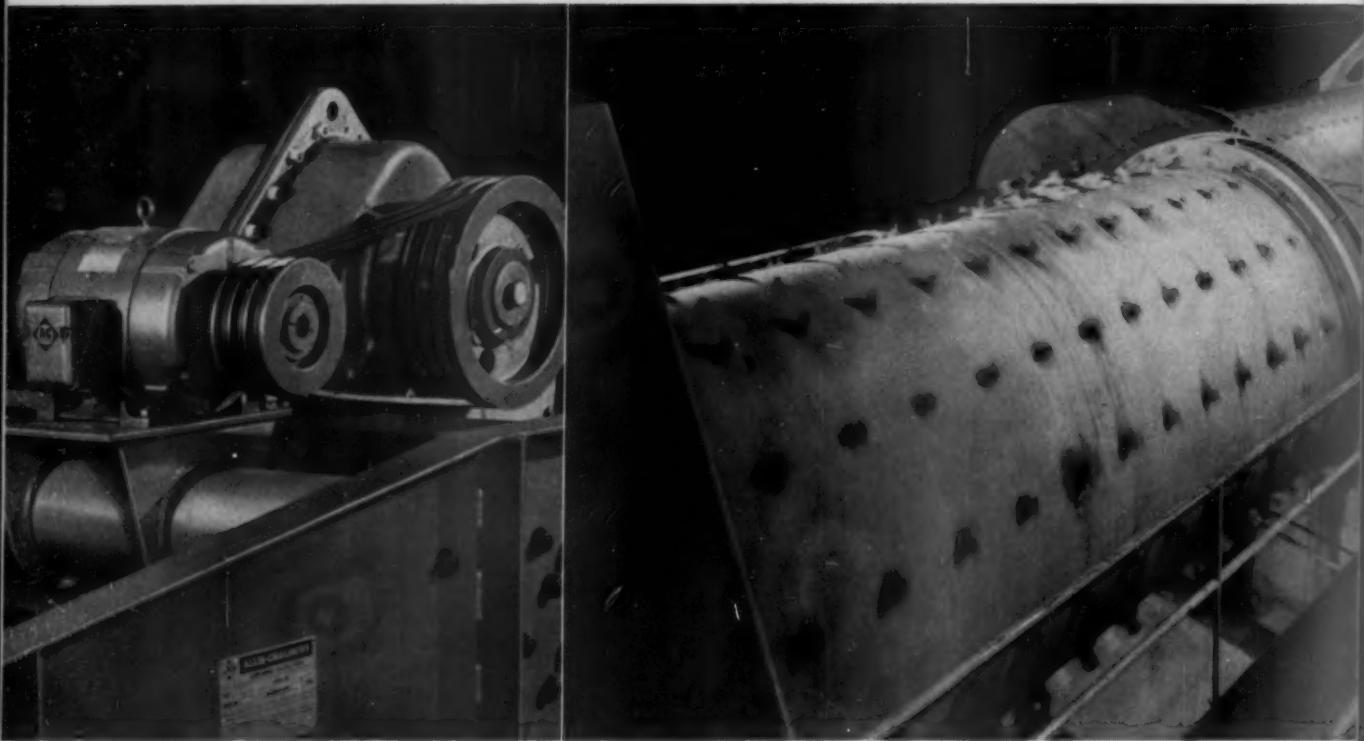


MACK
FIRST NAME FOR
TRUCKS





ideas and news:



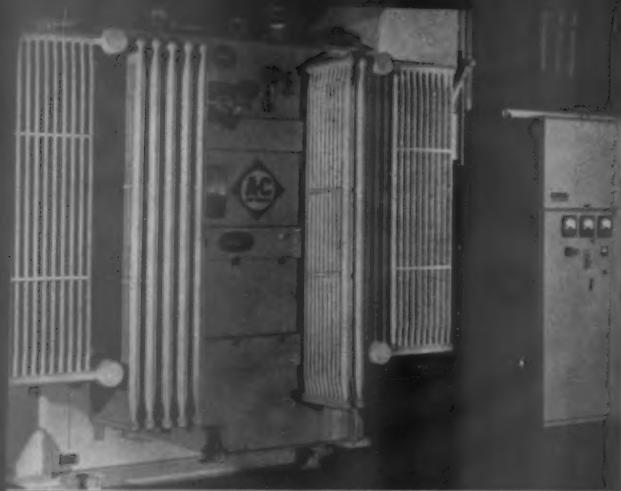
Low-Head screen with direct mounted motor: A completely integrated screening unit is this new, LOW-HEAD horizontal screen with direct mounted motor. No supporting structure, no belt tensioning or alignment problems plus headroom saving, smooth starts and stops, easy accessibility for maintenance. Another example of engineered screening from Allis-Chalmers.

Rod mills debut in cement "society": Two Allis-Chalmers overflow rod mills are being used by a Michigan cement company to wet grind cement raw materials in open circuit. Several other cement companies too are using them — all report substantial savings in labor and power requirements and a more uniform product. Biggest advantage of rod milling is preparation of sized feed for the tube mill, permitting the BALLPEB mill to grind satisfactory rotary kiln feed in open circuit.

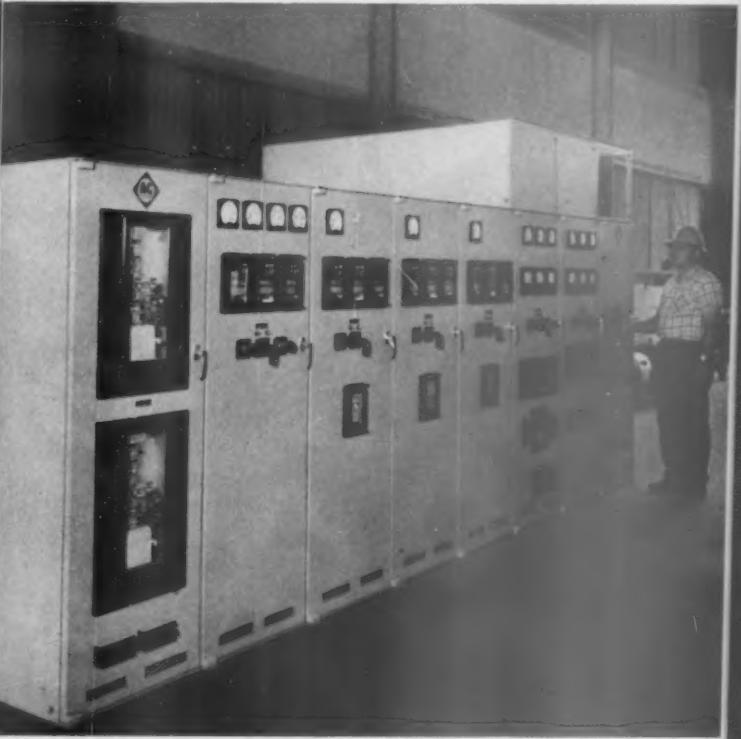
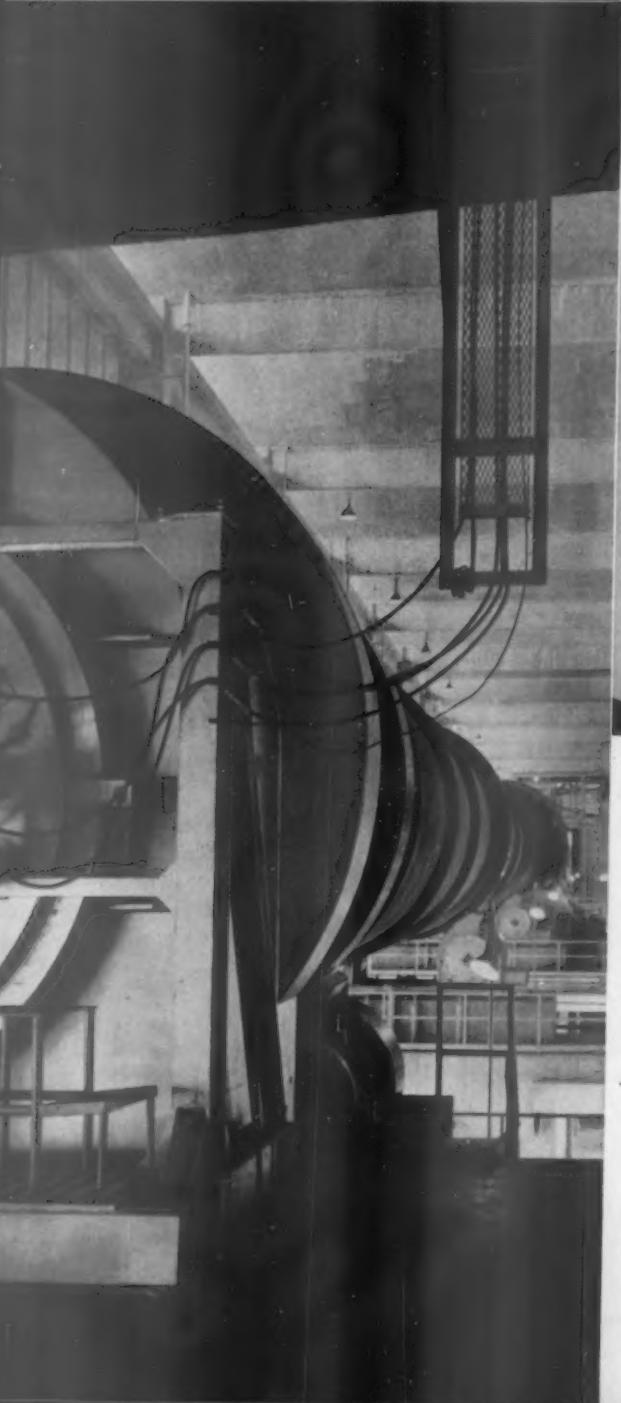
Which of these productive ideas could be working for you?

Screen with direct mounted motor. New ideas in kilns. Grinding mills that cut cement production costs. These examples demonstrate the extra value that is standard with A-C...the greater efficiency and the added productivity which are yours when you buy A-C products, systems and services. Call your Allis-Chalmers representative for details on A-C "worth-more" features. Or write Allis-Chalmers, Industries Group, Milwaukee 1, Wisconsin.

A-1482



A-C transformer offers multiple benefits: Located close to the load center in a Midwest cement plant, this 5000-kva CHLOR-EXTOL filled transformer provides reduced power losses, better regulation, and flexibility for expansion. Types available also include oil-filled, liquid-filled, and dry-type units (both sealed and open).



New A-C kilns have many innovations: Latest A-C rotary kilns feature: expansion type ring gears, removable firing hood faces, hydraulic thrust mechanisms, dual drives to overcome critical speed vibrations and independent hydraulically adjustable carrying mechanisms to keep roller faces in proper contact with riding ring face. New ideas in kiln engineering mark each new kiln from A-C.

ALLIS-CHALMERS PRODUCTS: Look to Allis-Chalmers for compressors, controls, crushers, earth-moving equipment, electrical distribution equipment, engines, generators, industrial systems, kilns, lift trucks, mills, motors, pumps, rectifiers, screens; thermal, hydro and atomic electrical generating equipment; tractors, transformers, unit substations.

ALLIS-CHALMERS

August 1961

Lime plant saves San Diego money

by Ralph S. Torgerson

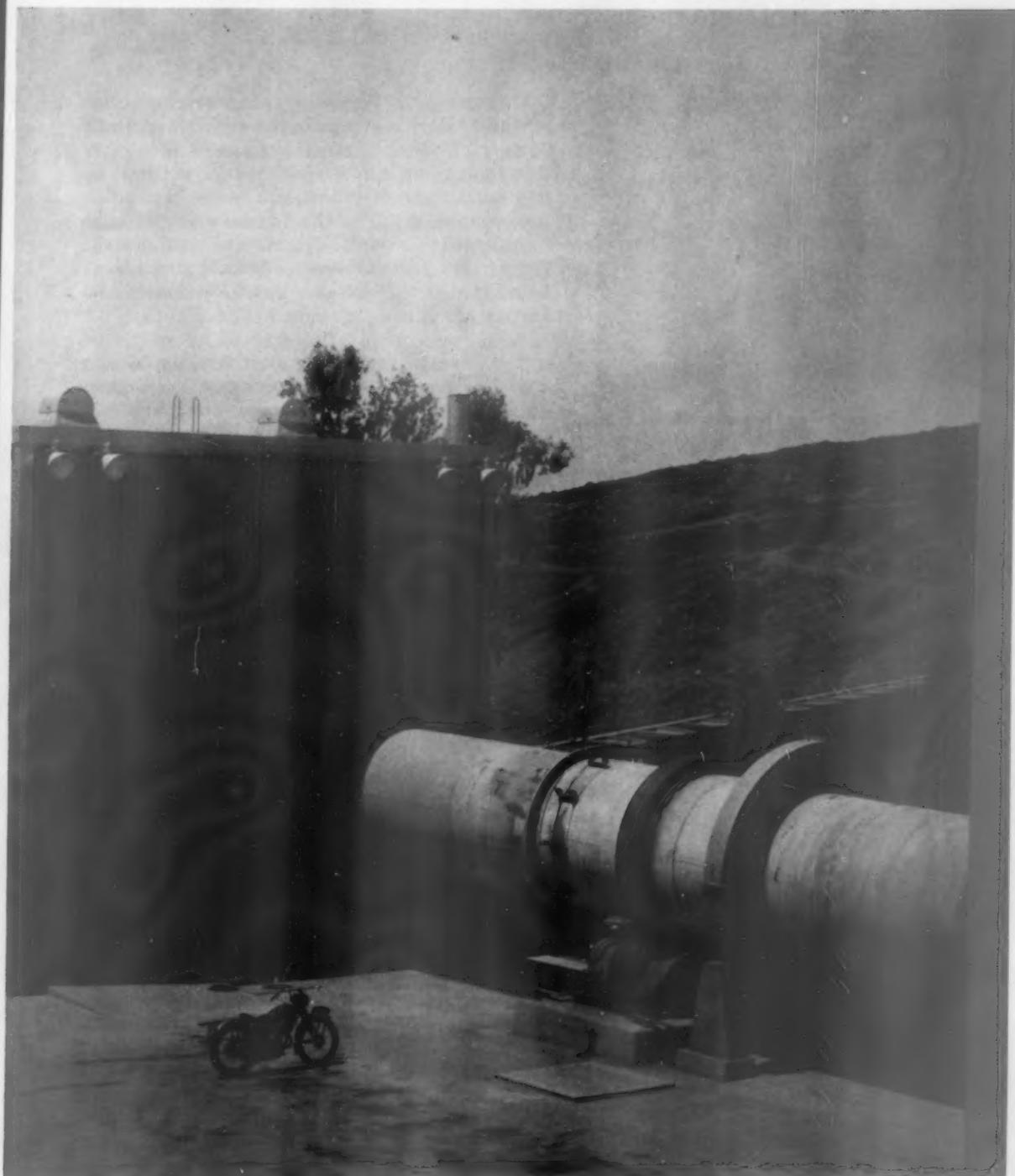
A LIABILITY HAS BEEN CONVERTED into an asset and an expensive nuisance has been eliminated in the process. This was the experience of the City of San Diego after it installed a \$535,000, 25-tons-a-day lime burning system to process its accumulation of water treatment sludges.

More than \$10,000 has been saved in the reduction of expenses associated with the operation of two 1½-acre sludge-holding lagoons. Here, the Alvarado water filtration plant collected the carbonate sludges precipitated from the 100 million gal. of Colorado River water that the city uses every day.

These settling ponds had to be excavated every year and the white gumbo hauled to disposal areas. There was no market for this material, and there were few places to dump it even in the canyon-furrowed countryside around San Diego.

Another outstanding saving has been achieved by completely eliminating the need for purchased lime and greatly reducing labor and storage expenses in handling lime. This purchased lime was costing more than \$25 a ton delivered from distant suppliers. The yield of reconstituted lime now is more than adequate for the water treatment process as it always adds more material to the system from the carbonates precipitated from the incoming water. The average chemical analysis of the recalcined lime is shown in Table 1, and the use of recalcined lime has presented no water treatment process problems.

Please turn page



This is just about all there is to San Diego's compact lime-burning plant

*San Diego joins a growing list of cities recalcining
lime sludges from water treatment process*

Lime plant saves San Diego money

continued from page 79



Thermocouples near chain section of kiln keep tabs on temperature of material at this critical point



A jet-spray scrubber takes out virtually all dust from the kiln's exhaust gases



Kiln controls are mounted on this compact, desk-sized console

The new lime processing plant now operates around 10 days a month in the winter and about 20 days a month during the summer. A new water treatment plant is under construction at Miramar to process about 50 million gal. a day. When this is completed, it will be able to send enough sludge to Alvarado to keep the kiln working continuously. If this plan goes through, additional savings can be realized as the inefficiencies of intermittent operation are eliminated.

The new lime calcining plant is equipped with a 7 x 100-ft. rotary kiln with integral Warner tube coolers, two steel sludge storage tanks, kiln feed building, kiln firing and lime discharge building, and a quicklime storage tank.

Each steel storage tank contains 108,000 gal. of sludge with about 20 percent solids in suspension. This is pumped from the settling basins by two 80-gpm. pumps against a head of 35 ft. Sludge is agitated in a manner similar to cement slurry tanks to keep all solids in suspension.

Sludge is usually drawn from one tank at a time. However, two pumps are set up so that either will pump sludge from either tank through a flow regulator and a flowmeter. Piping is arranged for sampling slurry feed. The slurry is pumped to a centrifuge on a platform above the kiln in the kiln feed building, and a magnetic flowmeter measures slurry flow to the centrifuge.

The centrifuge is capable of producing 6,000 lb. of slurry per hr. containing 35 to 40 percent moisture by weight. Two hoppers are attached to the bottom of the centrifuge housing; one handles the thickened slurry, and the other receives the centrifuge effluent which it discharges to the Lake Murray reservoir.

Centrifuged sludge is fed into the kiln with a water-jacketed screw feeder that extends about 18 in. into the kiln. The water jacket protects the screw from exhaust gases which are more than 600 deg. F. as they swirl about the feed screw. At the top of the feed end housing is an exit gas temperature thermocouple, feed end draft probe, oxygen analyzer probe, and kiln exit gas duct that leads to an induced draft exhaust fan. The feed building also houses a motor control center, magnetic sludge flowmeter, sludge flow regulator and service crane. An air compressor supplies the air that operates the controllers to relay information to the instruments on the control panel.

A wet gas scrubber takes the exhaust gases from the fan and strips out entrained fines. The air-operated butterfly valve damper between the

fan and scrubber is automatically controlled from the kiln firing end building, but it may be manually controlled. The scrubber sprays the exhaust gases with high pressure water from jets at the bottom of the scrubber tower. Exhaust gas flow is directed upward through slotted trays and against other water sprays along the inside. Gases discharge at a temperature around 150 deg. F. The scrubber does such an efficient job of removing dust that only a slight plume of steam is apparent in the cooler months and the vapor is almost eliminated during the warmer months of the year. Scrubber effluent is now piped back to the plant's water intake channel so that the entrained lime dust will not be lost from the system.

A chain system in the kiln helps to obtain greater thermal efficiency and to reduce moisture in the filter cake feed more quickly. The chains start about 6 ft. from the raw feed end and extend 9 ft. into the kiln. Moisture in the sludge in this section of the kiln is reduced from 35 to 10 percent.

The chain system adds greatly to the thermal efficiency of the kiln. At the same time, the chains help the rotary movement of the kiln form the finished calcined product into pellets. For most efficient operation at the pneumatic conveyor later in the system the desired pellet size is $\frac{3}{4}$ in. with a minimum of dust.

Kiln speed can be varied in four steps from about 27 to 72 rph. In an emergency, an auxiliary gasoline engine turns the kiln at 6 rph., just enough to keep material running through the kiln and to prevent a burn-out and kiln warpage.

Trolley wires on the kiln shell are connected to a thermocouple projecting into the kiln and the temperature is recorded at the instrument console. Kiln temperature at the firing end ranges from 2,200 to 2,300 deg. F. with fuel requirement about 10½ million Btu. per ton of lime produced. Normally the kiln uses natural gas, but it has provisions for oil burning or a combination of both natural gas and oil.

The kiln is lined with four sections of different types of refractory brick that were specified to match the temperatures and chemical reactions in the kiln. Kiln linings have stood up well in spite of the intermittent operation of the kiln.

Kiln control instruments are located in a separate room in the building at the discharge end of the kiln. Here a large window in the air-conditioned room provides a view of the burner floor area. The control console has air-actuated minia-

Table I Chemical analysis of recalcined lime product

	Percent
Fe ₂ O ₃	4.27
MgO	2.36
SiO ₂	1.77
CaO (Avail.)	82.64
Ca (OH) ₂	1.32
CaCO ₃	1.43
Total CaO	88.05

ture instruments which record, and indicate gas pressure, kiln exhaust gas temperature, chain system gas temperature, discharge end and kiln feed end drafts, percentage of oxygen in exhaust gases and lime sludge feed rate. Sludge level in both tanks is indicated as well as the centrifuge drive motor amperes. High-temperature alarms have been installed which signal excessive heat at critical locations.

Finished lime drops through ports into six cooler tubes which are an integral part of the discharge end of the kiln. Cooled lime at about 150 deg. F. drops from the discharge end at the tubes into a screw conveyor that moves it to a bucket elevator to lift lime to the storage bin.

The cooler tubes not only reduce the lime temperature but raise the temperature of the primary combustion air. This, too, adds to the thermal efficiency of the kiln.

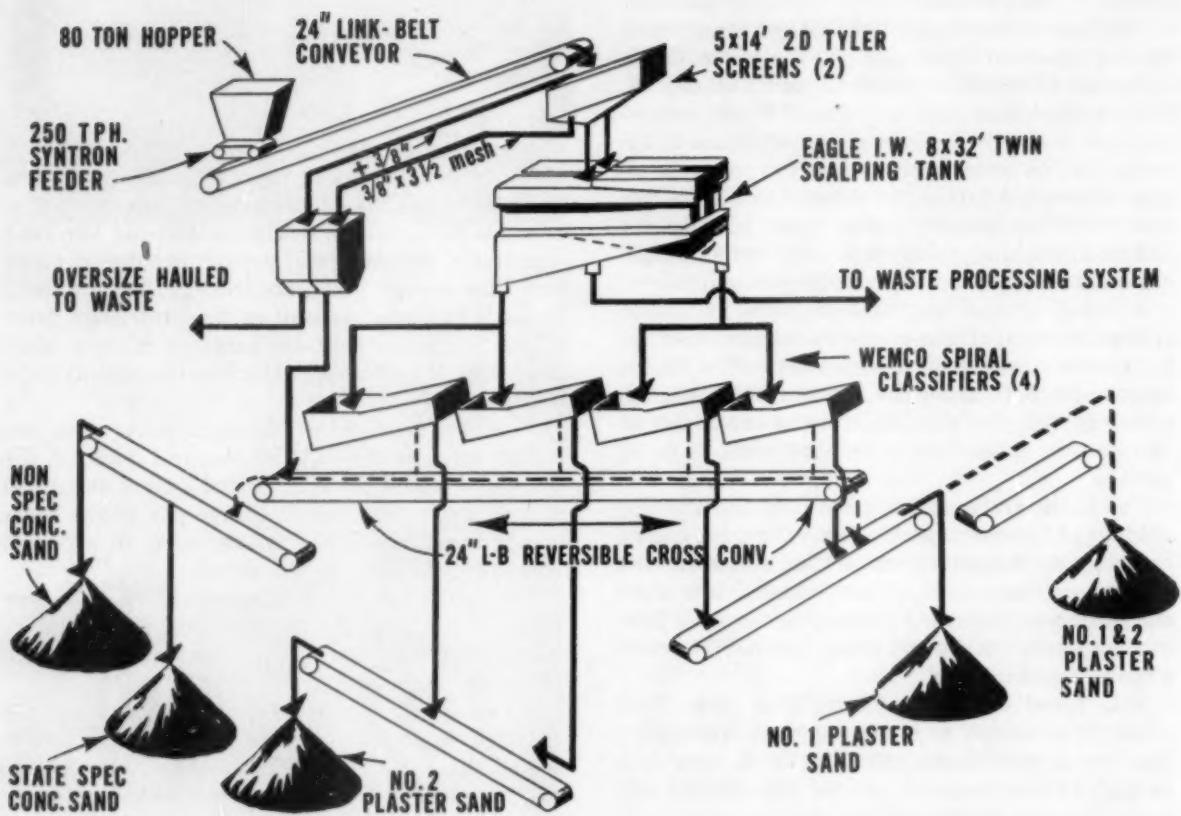
A valve in the conical bottom of the 400-ton calcined product storage bin regulates the flow to a pneumatic conveyor. This elevates the lime to the larger storage hoppers in the water treatment plant. However, the lime can bypass the bin and be discharged at the ground through a pipe parallel to the bucket elevator. It may also be discharged to the ground from the bin through a pipe on the outside of the building.

END

MAJOR EQUIPMENT REFERENCE

Kiln, 7 x 100-ft.	Allis-Chalmers Mfg. Co.
Auxiliary gasoline engine	Wisconsin Engine Co.
Kiln lining refractories	Harbison-Walker Refractories Co.
Kiln reducer	Jones Machinery Div., Hewitt-Robins, Inc.
Exhaust gas scrubber	Peabody Engr. Corp.
Bucket elevators	Link-Belt Co.
Screw conveyor system	Fuller Co.
Pneumatic conveyor system	Dorr-Oliver Inc.
Sludge tank mechanism, (2)	Bird Machine Co.
Centrifuge	
Controls and instruments	Minneapolis-Honeywell Regulator Co.
	{ The Foxboro Co.
Pumps	{ Allen-Bradley Co.
	{ The Deming Co.
Air compressor	{ Allis-Chalmers Mfg. Co.
Magnetic flowmeter	The DeVilbiss Co.
Consulting engineers	The Foxboro Co.
	Black & Associates

KAISER CARVES INTO A



for five specifications to serve sand-hungry market in California's
Monterey Bay area

by John H. Bergstrom

MOUNTAIN OF SAND...

A MOUNTAIN OF SAND near Santa Cruz feeds Kaiser Sand & Gravel's 250-tph. operation that supplies a 10,000-sq. mile market. The sand-hungry San Francisco Bay area is included in the territory that extends from Vallejo in the north, to Soledad south of the Monterey Bay area.

This plant combines great flexibility and simplicity with its high production rate to make five grades of sand for this demanding market.

Three key factors are responsible for this unusual combination.

- 1. Four specially designed spiral classifiers contribute to the compactness of the screening and classifying structure.

- 2. A cross conveyor permits blending of five products without additional equipment.

- 3. A waste reclaiming section prevents granular fines from filling up the settling pond.

In normal operation two bulldozers cut sand from the steep hillside and push it directly into an 80-ton steel hopper. Eventually, the push to the hopper will become too long for economical dozer operation and then bowl scrapers will be used. Under the hopper a vibratory feeder deposits the sand on a belt conveyor. It travels 1,500 ft. to the top of a 56-ft. high screening and classifying tower.

The top deck of a pair of double-deck 5 x 14-ft. vibrating screens scalps off all plus $\frac{3}{8}$ -in. material. This oversize drops into the 30-ton segment of an 80-ton divided steel bin. There is so little of this material that it is only hauled to the waste dump about every two weeks.

From the second deck, the $\frac{3}{8}$ -in. x $3\frac{1}{2}$ mesh oversize drops into the 50-ton section of the bin, to be later blended with the finer sand fractions to form two grades of concrete sand. The sand passing the second deck is split between the two sections of a twin 8 x 32-ft. sand scalping tank.

Two products come from the scalping tank: a fine fraction called No. 1 plaster sand, and a coarser fraction called No. 2 plaster sand. The scalping tank discharges the classified sands into a triple flume. Splitter gates at each of the tank's nine discharge valves provide precise control over product size.

Unlike conventional arrangements, all three flumes do not discharge under the center of the

tank. Two flumes at either end discharge their product directly into two pairs of spiral classifiers for further washing and de-watering. Unwanted size fractions are carried off in the center. This is not currently required but will probably be useful in the future, as screen analyses indicate a surplus of material in the 30 to 50-mesh range in some sections of the pit.

Arrangement of the spiral classifiers is something of an innovation. Four 48-in. simplex units are mounted at ground level directly under the scalping tank. But they appear to be two duplex units, due to a significant modification. The tank on this size unit normally flares 33 in. to each side at the discharge weir, forming a larger settling pool to aid classification. In this case, each pair of spirals has been built eliminating the right flare on one unit and the left flare on its mate. There is a saving of 66 in. in lateral mounting area for each pair; a total of 11 ft. for all four units. This allows all four classifiers to be placed directly under the scalping tank, a feat that would otherwise have been impossible.

The advantages? Each unit is individually powered, so that a failure in one means a re-

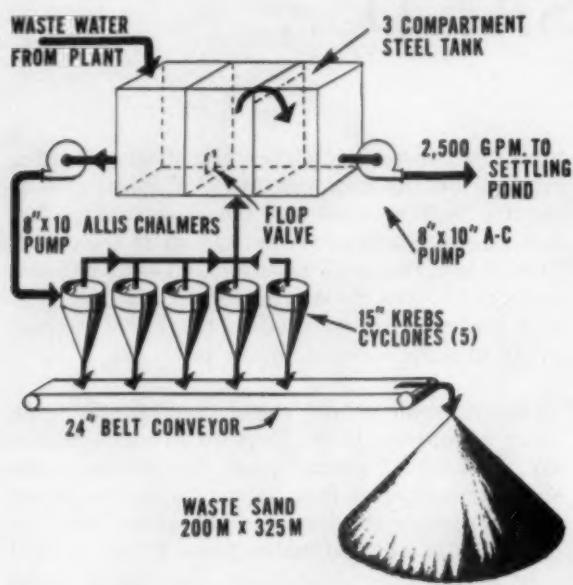
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A mountain of sand now dwarfs Kaiser's bulldozer that will eventually cut it down into a sand pile



Kaiser carves into a mountain of sand

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duction of only 25 percent in total production instead of 50 percent. There is individual control of speed, as well as type and quality of feed with each unit.

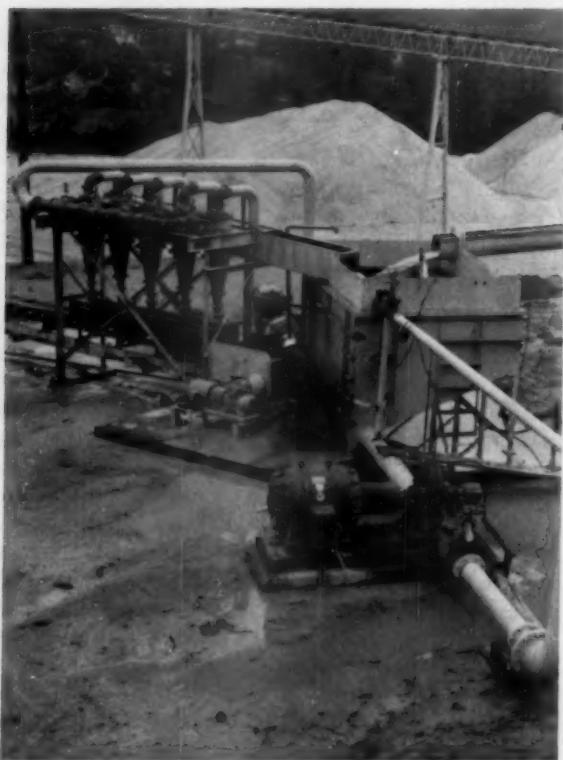
The possible adverse effects of reducing the classifier pool area were carefully studied by both Kaiser's and the manufacturer's engineers. Both decided that there would be no difficulty in retaining enough fines to easily meet specifications. Even though the spirals are running faster than recommended, this has proved to be true.

Even the ultra-fine sands are taken out of the tailing effluent before it goes to a settling pond. The granular minus 200 mesh material in the waste water from both the scalping tank and the classifiers is scalped out in a group of 15-in. cyclones. The plant waste waters flow to the first compartment of a three-compartment steel tank at the rate of approximately 2,500 gpm. The waste water is pumped from the first compartment of the tank to the cyclones by an 8 x 10-in. rubber-



Four specially designed spiral classifiers nested under the sand preparation system discharge to a blending conveyor

A battery of 15-in. hydraulic cyclones strips fines from the waste water to prevent premature silting of the tailings pond



lined sand pump. The cyclones remove all 200 x 325-mesh granular material, which is conveyed to waste storage for later disposal. The water and slimes are returned to the second compartment of the surge tank, where they normally overflow into the third compartment and are pumped 3,000 ft. to a settling pond. A flop valve between the first and second compartments guarantees a steady head on the pump feeding the cyclones.

These cyclones have a gum rubber liner which appears to make them almost impervious to abrasion. Similar linings used at another Kaiser plant have shown no appreciable wear even after two years of double shift operation.

The waste circuit is intended to keep fines from flowing to the settling pond, rather than recovering them for use. Since the settling area is limited, these fines could present a real problem.

A 90-ft. long cross conveyor is the key unit in a system that allows the simple blending of five

finish products from the plant's three basic size separations. The three basic products are: No. 1 plaster sand; No. 2 plaster sand (which contains a greater amount of minus 16 mesh material), and $\frac{3}{8}$ -in. x 3½-mesh material.

Both the No. 1 plaster sand and the No. 2 plaster sand can be conveyed directly to ground storage or blended on the cross conveyor to produce a product called "1 and 2 mixed", which is very popular locally. The cross conveyor is also used to blend two grades of concrete sand—a general grade and one containing fewer fines to meet state specifications.

To blend concrete sand the cross conveyor is reversed. In addition to drawing sand from both pairs of classifiers, it also receives a carefully controlled amount of $\frac{3}{8}$ -in. x 3½-mesh material from the storage bin. The belt depositing the coarse fraction on the cross conveyor moves very slowly allowing the operator considerable control over the blend.

A concrete reclaim tunnel runs under the storage area. Sand is put into two openings over the tunnel with a front-end loader. A pair of vibratory feeders deposit the sand on a 30-in. belt conveyor leading to the five 80-ton steel truck-loading bunkers. Two additional bins will be added shortly to handle peak shipping requirements.

It's on the books—an efficient plan for future expansion which would increase capacity 50 percent for a modest additional investment. According to designer and plant engineer Jack Heck, an additional 125 tph. in capacity can be added by acquiring one more screen, a single 8 x 32-ft. scalping tank, and by replacing the 48-in. classifiers with 60-in. units. No changes in basic structure or material handling facilities will be needed, as this modern Kaiser plant looks forward to satisfying its flourishing markets in the northern California area.

END

MAJOR EQUIPMENT REFERENCE

Tractor shovel, 2½-cu. yd.	.....	Caterpillar Tractor Co.
Bulldozer, (2)	.....	Allis-Chalmers Mfg. Co.
Bulldozer, (1)	.....	Link-Belt Co.
Conveyor idlers	.....	U. S. Electrical Motors Inc.
Conveyor motors	.....	Aetna Rubber Co.
Conveyor belting	.....	The W. S. Tyler Co.
Vibrating screens, 5 x 14-ft. DD, (2)	.....	Eagle Iron Works
Sand scalping tank, twin 8 x 32-ft.	.....	WEMCO Div., Western Machinery Co.
Spiral classifiers, 48-in., (4)	.....	Sytron Co.
Sand-Clones, Series 1500, WEMCO (Krebs), (5)	.....	Allis-Chalmers Mfg. Co.
Vibratory feeders, (3)	.....	Square D Co.
Pumps, (2)	.....	The Howe Scale Co.
Electrical controls	.....
Truck scale	.....



Five conical tanks are arranged for rapid truck loading



*Here's how aggregates producers can benefit from the experience
of metals miners who have refined the technology
of handling and sizing raw materials*

Look to metallurgy for processing tips!

by C. E. Golson & D. E. Newton*

AGGREGATES PREPARATION is a form of mineral processing which has been taken for granted for many years. Many of the processes and equipment now used in more glamorous metallic mineral processing originated in the more prosaic preparation of aggregates. Their adaptation to metallurgical processes has led to refinements in design and application. Modern practice has been so exacting that this improved technology is finding new applications in the very industry in which it originated: the mineral aggregate or rock products industry.

Low costs, large tonnages and complex specifications have made modern aggregate processing a much different art than it was one or two generations ago.

The raw materials for aggregate preparation must undergo various operations in order to obtain finished materials which will possess definite characteristics required by construction or paving engineers. These requirements involve: (a) cleanliness, (b) homogeneity, (c) surface characteristics, (d) size gradation, (e) particle soundness.

The extent to which a processed aggregate approaches the ideal concept of each requirement is, of course, limited by the economics of geology, location, investment and state of the art of processing machinery.

*Mr. Golson is Consulting Engineer and Mr. Newton is Manager, Aggregate-Conveyor Dept., WEMCO Div., Western Machinery Co.
This is a summary of a paper presented before the Industrial Minerals Div., Society of Mining Engineers of AIME at St. Louis, February 1961

For discussion of processing machinery we have divided processing steps into groups and sub-groups. Our discussion of principles, processes, and equipment will follow this general pattern.

1. Preparation of aggregates
 - a. Size reduction or comminution
 - b. Scrubbing and washing
 - c. Sizing by screening
 - d. Sizing by hydraulic methods
2. Beneficiation of aggregates
3. Materials handling
 - a. Conveying
 - b. Feeding
 - c. Pumping

The principles applying to the mechanical preparation of aggregates are at variance with the straight line requirements of metallurgical practice. Most aggregates specifications are based on zones of permissive values. That is, values between a minimum and a maximum. In addition, specifications usually call for a full spectrum of size gradations, from the largest permissible size to the smallest. In metallurgy the size of the product is limited only by economic considerations to the cost of achieving optimum particle size for maximum yield of metal. The only reason for comminution here is the liberation of mineral particles from the gangue or matrix.

In the preparation of aggregates comminution has a threefold purpose: (1a) the reduction in size of those particles larger than can be used in construction; (2b) the production of a material whose size gradation will fall within limits of specifications for each sieve size, and (3c) the

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Fig. 1—A Blake crusher is in operation in a quartzite quarry at Baraboo, Wis. (Chicago & Northwestern Ry photo)

Look to metallurgy . . .

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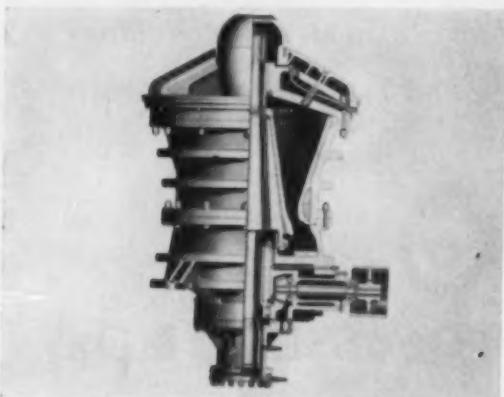


Fig. 3—The gyratory crusher is the rock products producer's workhorse for primary reduction in the United States (Allis-Chalmers photo)



Fig. 4—Single-roll crushers can be used as primary crushers in softer, more friable formations (Allis-Chalmers photo)

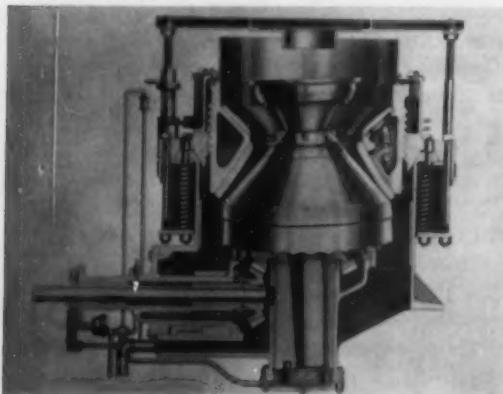


Fig. 7—Gyratory crushers for secondary reduction are made with flatter concaves and mantles (Nordberg Manufacturing Co. photo)

production of shape or surface conditions required to obtain the proper strength of concrete. Later we will discuss differential degradation for the elimination of unsound or deleterious fractions.

Three stages of crushing are widely used in processing aggregates—primary crushing, secondary or reduction crushing, and fine crushing or grinding. The application of external forces to rocks causes them to break into smaller pieces; this is an important factor in the selection of the proper machine. The subdivision of the various types of equipment used according to the size and direction of these forces will help in analyzing their most advantageous use.

These forces are exerted in varying proportions with shear and attrition always present to some extent.

- a. Compressive forces are exerted by gyratory and jaw crusher.
- b. A combination of compressive and attrition forces are used by cone crushers.
- c. Impact forces are exerted in impact breakers and hammermills.
- d. Roll crushers provide a combination of shear and compressive forces.
- e. Rod and ball mills give a combination of impact and attrition.

A crusher selection for the needs of a specific job calls for some basic considerations. These will influence the choice of type and size of a particular machine:

- A suitable crusher must have a large enough feed opening to take the largest possible rock.
- The capacity of the machine must be selected to minimize idle time.
- It should be strong enough to break the hardest and toughest piece of rock, and yet be provided with safety releases so that damage will be prevented when it encounters stray steel or wood.
- The reduction ratio (the relation between size of feed and that of product) should be high; the power consumed to attain this effect should be low.
- It should be economical in both original and operating costs when equated with the results expected.

The most common primary crusher is the compression type. It is selected where the raw material is hard or tough, or where it contains abrasive fractions. Since the forces exerted by compression may break across natural planes of structural weakness, the shape of the products may vary considerably. Since these machines are de-

signed for a single application of external forces, a minimum quantity of fines is produced.

When the material contains slabby, flat or elongated pieces, the gyratory crusher (Fig. 3) is more effective than the jaw crusher, since for the same gape there is less straight line opening. This type is not recommended, however, where extremely hard pieces of rock will have to be broken. As a general rule the gyratory crusher is selected when large tonnages with no excessively large size pieces are to be crushed.

The Blake jaw crusher (Fig. 1) has a greater structural strength for equal jaw opening, but a smaller capacity than the overhead eccentric type. It is the natural selection to handle massive, hard and abrasive materials; it is used to crush quartzite in a Wisconsin quarry.

The overhead eccentric jaw crusher is selected for material of average hardness where the oversize pieces can be numerous but not gigantic, and there are fewer abrasive fractions. It is lighter in construction than the Blake type but strong enough for most aggregate applications.

Its lower installation cost and power requirements explain its popularity in the rock products industry and its nearly universal use in portable plants.

The single-roll crusher (Fig. 4), rarely used in metallurgical practice but extensively in coal preparation, sometimes finds a use in the aggregate industry as a primary crusher. The forces exerted are much more complex: A toothed roll impinges on the material producing some breakage through impact; the material is then carried into a narrowing gap between roll and breaker plate and further degradation is obtained through both compression and shear.

An impactor, as its name denotes, uses impact to effect primary crushing. A series of rapidly revolving hammers strike the quarried stone. In addition, the material is flung against breaker bars or plates and this impact also serves to break the rock. Entering material hits against the flying pieces of rock and this impact too contributes to the general degradation of the entering feed. The impact crusher is usually selected when the rock is average in hardness, is low in abrasive material and does not have extreme oversize pieces or enough clay to prevent compression, attrition or shear breakage. The size and shape of the end products depend on the natural fractionation of the rock. In most cases, they are roughly cubic, following natural crystallization and cleavage planes, with distribution ranging evenly from the

coarsest sizes down to the finest. But where these finer sizes are detrimental or where the material is particularly friable, the single roll crusher can replace the impactor advantageously.

In aggregates production, usually, it is not necessary for all crushed products to pass a given size as it is in the metallurgical industry. And it is quite common to use greater reduction ratios in the primary crushing stages of the aggregate industry. However, rock and coarse gravel seldom can be reduced to the required sizing in a single crushing pass. Just as in metallurgical practice, the aggregate industry is compelled to resort to one or more additional stages of crushing. Fractions which have reached the finished gradations usually bypass these stages, and the oversize from secondary or reduction crushing is recirculated until it attains the suitable particle sizes.

The same general types of crushers are used for secondary as for primary crushing. Since the feed is pre-sized there are no excessively large pieces to handle. Thus, great reduction ratios are not necessary, but through prolonged action in the crusher, more effectiveness can be achieved. Secondary crushers have been modified to achieve this retention time.

The cone type of gyratory crusher (Fig. 7) or one of its many derivatives, is designed for reduction control on the closed side of the eccentric motion instead of on the open side, as is the primary type of gyratory. This is achieved by flattening the slope of both concaves and mantles so that several cycles of compression are exerted as the material flows from top to bottom to be discharged.

It is difficult to design a jaw crusher for the longer retention time necessary for effective reduction, secondary crushing. Thus, this type is used only rarely and then for special applications.

A roll crusher (Fig. 10) is ideally suited for reduction crushing since a close control of product size can be maintained by regulating both the distance between rolls and the tension of the springs. The reduction ratio can be increased readily, while varying the speed of the roll usually increases the capacity. The fact that these crushers do not over-crush or degrade rock into excessive fines is one of their big advantages. These advantages are offset by relatively high power requirements and by the wear on the roll faces which need costly, skilled labor to maintain them effectively. Because of transmitted vibration, the rolls require heavier foundations or supporting struc-

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Look to metallurgy . . .

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tures than other secondary crushers of the same capacity.

Where the nature of the material or the specifications of the product allow its use, the hammermill (Fig. 11) is a very effective reduction crusher. This machine is very much like an impactor except that its action is more violent and a cage of bars set at a predetermined opening prevents oversize material from leaving the crushing zone. A larger amount of fine particles are generated than in other types of secondary crushers. High cost of maintenance and the downtime for this

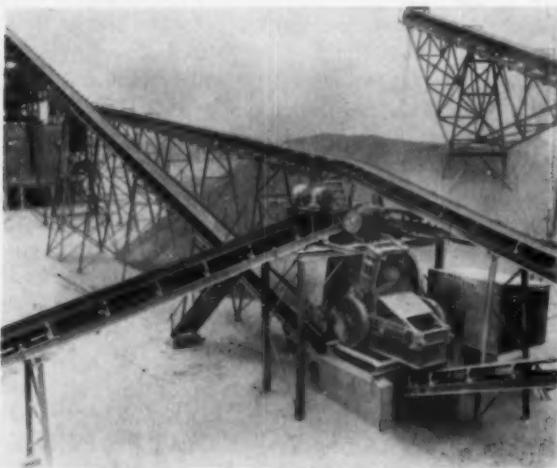


Fig. 10—Roll crushers are often very effective as reduction units. Standard Industries uses this three-roll unit in its East Tulsa plant

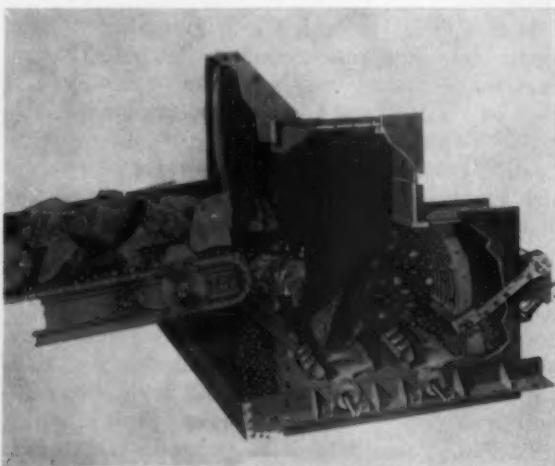


Fig. 11—Single- or double-impeller hammermills can be used as secondary crushers where material and specs permit (Hammermills, Inc., photo)

maintenance restrict the application of this type of crusher.

As concrete technology progresses and as deposits of acceptable sands become scarcer in many areas, fine crushing and grinding has become quite common. When available sand is considered incompatible with other components of the mix, or is deficient in certain size fractions, it is often more economical to manufacture sand than to import it from a distant deposit. This is particularly true when there is an excess of a larger size fraction which can be used as raw material for further reduction. A further stage of comminution is the economical answer. In a dry plant the fine crushing can be carried out effectively by the use of modified cone crushers or with a close-set roll crusher.

But, since sand normally requires wet classification, the trend towards use of wet grinding mills is increasing. Where intermediate sizes are desired, the rod mill is used; where the finer sizes are sought, the ball mill is used.

The aggregate industry has greatly modified some of the fine crushing and grinding practices common in metallurgy. Where nature of the rock product desired needs only a fast grind, the central-peripheral-discharge rod mill fed at both ends nearly doubles the capacity of a mill. For a given length and diameter it is more economical in first cost and installation cost than two smaller mills. A careful balance of the simultaneous feed is important to effective operation. The end-peripheral-discharge rod mill is designed for more extended grinding, and the trunnion-discharge type increases the retention time still further. The advantages of the rod mill have been pointed out repeatedly; it is self-screening in effect and produces a minimum of either oversize or undersize.

The ball mill is not as commonly used in the aggregate industry as it is in the portland cement industry. It should have a definite place in the production of fine fractions. Perhaps its mechanics have not been completely explored, and possibly the concrete engineer has not fully realized the value of these finer fractions. The 150 sieve is considered the finest to be used in many cases in sizing fine aggregates for conventional mixes, although in finishing concrete, material as fine as 325 mesh often yields a creamier mortar that is easier to work, giving a smoother appearance.

Editor's note: The second part of this three-part series will deal with the design concepts involved in scrubbing and washing

END

New control concept steps up clinker cooler efficiency

Statistical tools monitor kiln operation

by D. H. Gieskieng*

THIS IS AN EXTENSION of an article that appeared in **ROCK PRODUCTS**, February 1960, page 150. Two new uses for nuclear bed depth controls on clinker coolers are possible: (1) a weighing device for clinker and (2) a continuous low lag time parameter of clinker liter-weight.

This liter-weight parameter is unique. It avoids some of the difficulties of optical pyrometry in the burning zone of the kiln, which may reveal surface temperature of the clinker, but not necessarily the thoroughness of the clinkering operation. The parameter involves partial testing of the through-heat of the clinker particles by the heat-demanding influence of preheating secondary air, and simultaneously weighing the clinker to complete the heat approximation. This marks the first use of the clinker cooler as a weighing device, largely due to bed-depth control using the gamma ray level gauge.

Adequacy of kiln calcining zone preparation is an important factor in clinker condition. This is evidenced by the extent of the exothermic clinkering reaction and consequent clinker through-heat. The parameter takes the calcining preparation into account.

While the parameter evaluation is after the fact, it quickly discloses trends making possible

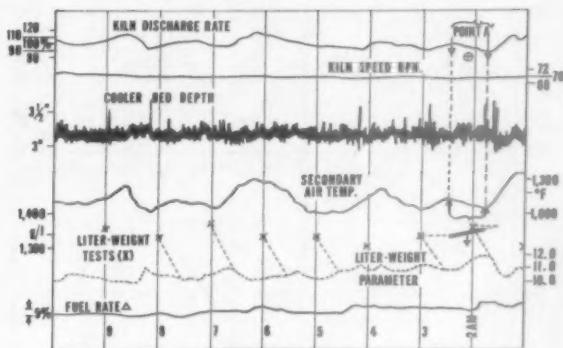


Fig. 1—Moderate kiln cycling under gamma-gauge bed depth control yields these typical profiles

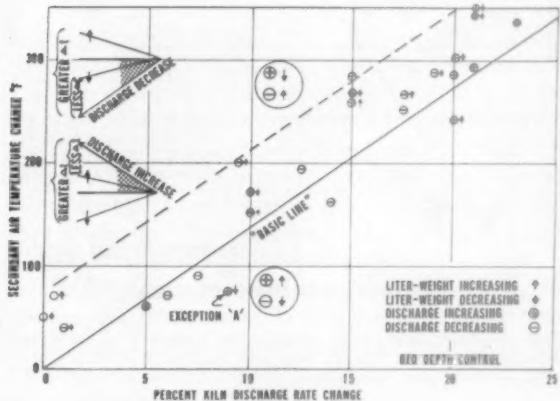


Fig. 2—Most of the secondary air temperature variation is due to kiln discharge rate variation

appropriate operation adjustments while they are still timely. Of particular advantage is the rapid detection of burning zone anomalies. These include consideration of this critical area with longer range calcining preparation.

The parameter index was first derived on the basis of relationship to liter-weight tests in a plant where these tests are routinely taken and are usually dependable. However, the difference of the parameter and its statistical sampling approach offer advantages for plants where liter-weight tests have not been satisfactory.

Most of the data here are from a comparative test program on the same cooler. This involved both bed depth control using a gamma ray level gauge and an undergrate pressure control. When the cooler was on undergrate pressure control, the

Please turn page

*Industrial Systems Dept., Allis-Chalmers Mfg. Co., Milwaukee, Wis.

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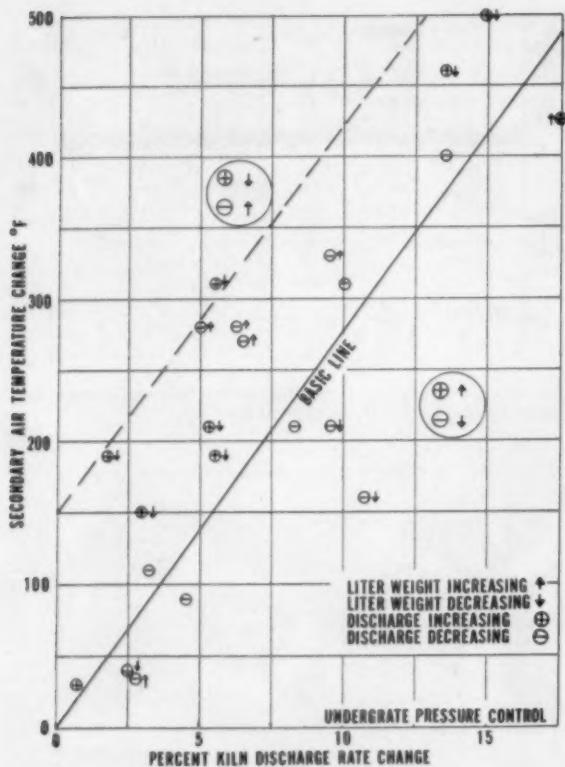


Fig. 3—Basic line with undergrate pressure control has steeper slope than Fig. 2, based on bed depth control

gamma gauge was recorded, resulting in bed-depths to enable derivation of kiln discharge variations and to form a basis of comparison between the two control systems. The concept of using the cooler itself as a weighing device and the "liter-weight parameter" are consequences.

We have developed the subject in this order:

- 1—effect of kiln discharge rate on secondary air temperature using (a) bed-depth control and (b) undergrate pressure control
- 2—the cooler as a continuous weighing device
- 3—continuous clinker liter-weight parameter
- 4—effect of firing rate variation on parameter
- 5—effect of clinker size on secondary air
- 6—air flow control
- 7—cooler control stability.

It is apparent at first glance that secondary air temperature is basically a function of kiln discharge rate, peaks and valleys of one corresponding to peaks and valleys of the other. This relationship is further probed by comparing the ampli-

tudes of the temperature and corresponding discharge cycles as in Fig. 1 and plotting in Fig. 2. Point "A" involves a discharge increase of 9 percent and a corresponding cooler over-grate temperature increase of 75 deg. F.

Most of the secondary air temperature variation is due to kiln discharge rate variation. It will be noted in Fig. 2 that there is some spread of values, principally above the basic line. These deviations are comparable with clinker liter-weight variations if they are not masked by precipitous firing rate changes. While point A is "masked" on both Fig. 1 and 2, it is used to illustrate the transfer of values between the figures.

It is generally agreed that—through a practical range—clinker heat and clinker liter-weight are related, that is, the more thoroughly the exothermic clinkering reaction takes place, the hotter the clinker. There is less free lime and higher liter-weight. But after temperatures are reached, there may be disassociation and a disruption of the trend. Any plant now using liter-weight as an operation guide is below such a limit.

Assuming the temperature liter-weight relationship is useable, the points in Fig. 2 may be further examined according to the diagrams in the upper left. Depending upon the kiln discharge rate increasing (+) or decreasing (-), the temperature variation effect of the liter-weight change (\uparrow or \downarrow) in the same period will be additive or subtractive to the basic secondary air temperature change, due to discharge rate variation. Above the basic line, frequent deviations—caused by increasing discharge and decreasing liter-weight or by decreasing discharge and increasing liter-weight—can be expected. This is due to changing kiln bed and "kidney effect". Below the basic line, opposite combinations may be expected. An exception is point A in Fig. 1 and 2, where a coincidental sharp decrease of fuel additionally suppressed this point.

This basic line is established by points with little liter-weight shift. This area is accordingly reduced to secondary air temperature variation versus kiln discharge rate variation. The bed-depth controlled basic line has a slope of about 14 deg. F. per percent kiln discharge variation.

Note that the broken line above and enclosing all of the points in Fig. 2 is parallel to the basic line, which is expected for the type of deviations involved. That is, a liter-weight shift can affect secondary air temperature with or without variation of kiln discharge rate.

An analysis of an undergrate-controlled opera-

tion is similar to the gamma gauge bed-depth control except that it is more involved to calculate kiln discharge rates. With a constant depth of bed, conveying capacity can be resolved reasonably well as a function of speed and stroke. With undergrate pressure, control, speed and stroke have to be considered and variation of bed-depth as well.

The undergrate pressure test ran for 48 hr. under kiln conditions somewhat similar to the bed-depth control period. The amplitudes of various cycles are plotted in Fig. 3.

This figure is similar to the liter-weight effect in Fig. 2; however, the basic line has a slope of about 28 deg. F. per percent—twice that of bed-depth control on the same cooler.

With either bed-depth or undergrate pressure control, an increase or decrease of kiln discharge rate nominally results in an increase or decrease of cooler conveying action. This, in turn, takes more or less heat into the waste heat zone of the cooler and tends to stabilize the temperature of the air going to the kiln. Bed-depth control apparently achieves this effect most completely.

In some undergrate pressure controls the cooler fan damper is actuated by a secondary air temperature controller—an effort to compound the action and improve secondary air temperature stability. Firing hood pressure is thus governed by the waste air damper. Similar arrangements can be used with bed-depth controlled coolers but there is much less need to do so; 14 deg. F. per percent compared with 28. Some operators even believe that a moderate temperature shift is desirable to help meet the load.

The cooler itself can be operated as a continuous weighing scale. Operationally it is very convenient to give the operator a running indication of the kiln's discharge rate. Not only is it possible to observe the buildup and release of material in the kiln, but it can be a basis for estimating clinker heat instead of clinker surface temperature.

With gamma ray gauge bed-depth control, the approximate conveying rate can readily be indicated or recorded as a function of bed-depth, cooler speed and stroke. The results are partially weight-compensated compared to volume since the signal is a result of both bed-depth and density.

While a few large pieces of clinker may not seem to follow the general conveying pattern, the over-all conformance and reproducibility of using the cooler for weighing is surprising. It is often in excess of 95 percent, depending on the extent of instrumentation.

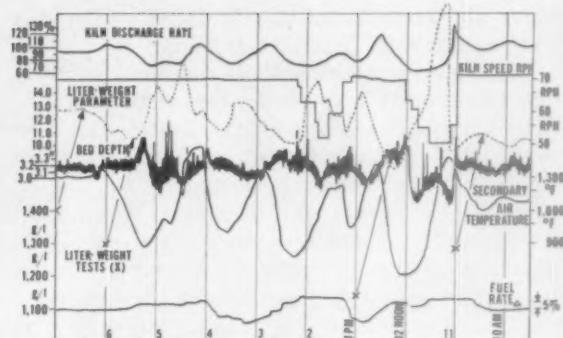


Fig. 4—Severe kiln cycling produces these curves with bed control

In achieving continuous clinker liter-weight parameter, the weight of a liter of a selected size fraction of clinker is frequently used to provide the operator with short-term information as to the quality of his product, free lime, etc. This determination is usually made every hour or two and supplements less frequent, more elaborate laboratory analyses. Many operators state, "liter-weight tests tell me how hot the kiln is."

The data obtained in the tests described suggest the possibility of a simple continuous presentation of an index more pertinent and timely than the liter-weight tests. But it is similar enough to call it "liter-weight parameter."

Continuous availability of the parameter would not only have assisted in stabilizing the upset shown in Fig. 4, but would have provided a fueling index which could have been used to avoid an upset in the first place. For the parameter indicated that the kiln was slightly underfired for about 7 hr. before the upset.

The concept of the parameter is this: A given firing and kiln discharge rate will result in a corresponding secondary air temperature, nominally a function of clinker heat. Any deviations from this relationship are associated with thoroughness of the clinkering operation.

While the parameter may be expressed in more complete forms to include firing rate, drafts, etc., the ratio of secondary air temperature to kiln discharge rate simply incorporates the main elements of the concept.

To include automatically the effect of variation of ambient temperature in the clinker heat test as well as slightly improve proportionality, the sec-

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ondary air temperature may be taken as degrees F. above ambient. This is done simply by placing the secondary air thermocouple reference junction (uncompensated) in the cooler fan suction.

The kiln discharge rate may be continuously approximated by simple instrumentation as a function of bed depth and cooler speed.

Kiln discharge rate may, in turn, be continuously compared with the secondary air temperature signal and the ratio of these constantly presented by commercially available instruments. This ratio is available for controlling various factors such as kiln speed, fuel, primary air ration and others singly or in combination to stabilize and hold the kiln at optimum operating conditions.

Of particular interest is the possibility of using the liter-weight parameter to stabilize the kiln by adjusting its speed. As in Fig. 4, the response is rapid. Thus, relatively small speed changes would be required if made at the proper times.

Fuel control by the liter-weight parameter meth-

od would have some inherent advantages, as variations of fuel quality and moisture, would be compensated for. The optimum arrangement may be parameter control of both kiln speed and fuel rate through limited ranges.

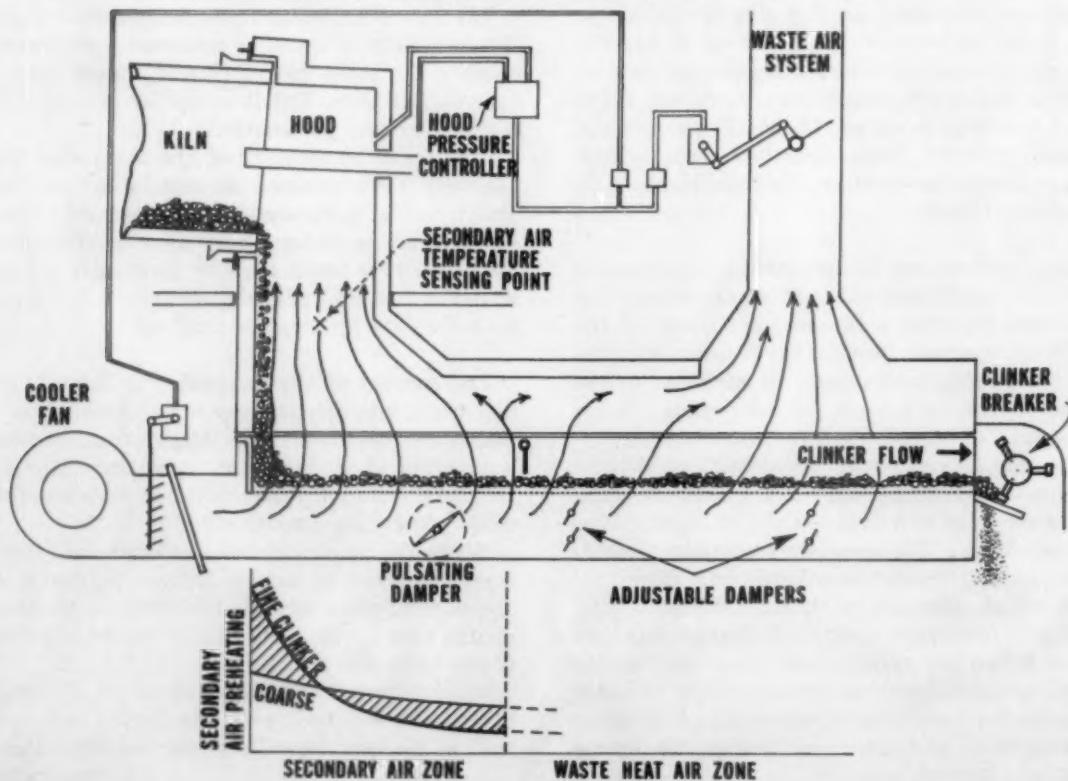
A review of the liter-weight tests (x) in the figures show tracking with "liter-weight parameter." Consider that the tests were made on clinker that passed through the secondary air zone of the cooler about 30 min. before, and that the samples were taken routinely only approximately at the time (x) indicated. Where the trends gradually deviate, as in Fig. 1, the parameter is a superior operational index.

Depending upon the flame shape and magnitude, the discharge end of the kiln acts as a rotary cooler, more or less, and the clinker being discharged into the cooler will be more or less precooled. This influences secondary air temperature and the liter-weight parameter.

To more completely align the parameter with liter-weight tests, the equation should include an

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Fig. 5—Cross-section through a typical cooler shows that clinker is in contact with incoming secondary air for some distance on the cooler



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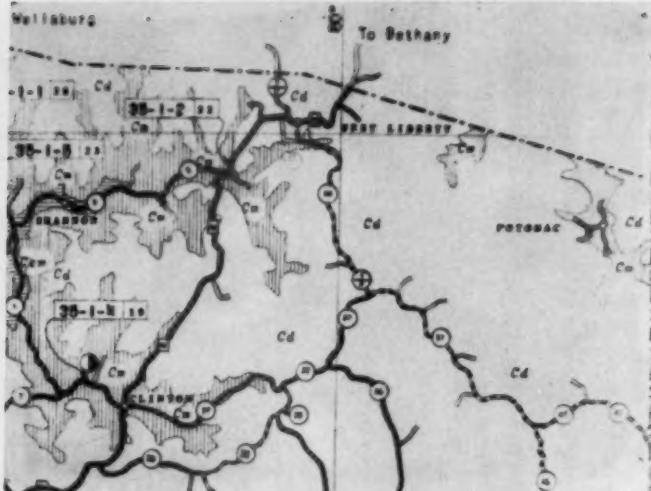
West Virginia sizes up the aggregates situation

by R. W. Seeger
& J. A. Kent*

AGGREGATES ARE DEVoured at an alarming rate by today's constantly expanding highway system. For speedy and economical aggregates production, leading to the most efficient roadbuilding, a materials survey such as West Virginia's is practically mandatory answer.

Who benefits from such a survey? Practically everyone associated with designing a highway, building it and maintaining it. By learning the location of materials, designers can more readily prepare specifications which enable the use of those easily available. Highway planners may utilize a survey by routing proposed roads through areas having sufficient material of the type needed to meet construction requirements, at the same time saving many dollars by keeping hauling distances within an economical range. The West Virginia survey's comprehensive maps and charts help indicate areas of weak substrata, and those requiring expensive cuts and fills. And the programmer, having definite information regarding availability of material, can request bids in several areas simultaneously.

Contractors and district and county highway maintenance engineers can plan their work more intelligently and with more security by using such a survey. Readily available information on aggregate sources should stimulate county road super-



Portion of the Highway Construction Materials Map in the vicinity of Sample 35-1-4; symbol identifies this location as an abandoned quarry in the Mononghela Series. The Los Angeles rating is 19

visors to quarry and stockpile crushed rock for secondary road maintenance. And eventually the savings brought about by this increased efficiency should filter down to the taxpayer.

Specific benefits to the contractor include physical descriptions of the material for easy identification in the field. Information is provided as to the quantity and type of overburden to be expected at any location; the distance from quarry to jobsite, and the type of terrain over which the material must be hauled. Information also is provided to assist in determining how the material can best be extracted; how much drilling and blasting will be required; interference affecting operation, and the availability of power, water and working space. A thorough materials survey provides information as to whether or not the materials will meet specifications, and will aid in the grading of material of various specifications for prescription mixing.

The State Road Commission of West Virginia, with the support of the U. S. Department of Commerce, Bureau of Public Roads, initiated a study designed to provide such a survey for the state of West Virginia. This work, being carried on by the Engineering Experiment Station of West Virginia University, was begun in 1957 with the formation of the Highway Aggregate Research Project. The objective—an independent compilation of a com-

*Engineering Experiment Station, West Virginia University, Morgantown

prehensive inventory of highway aggregates within the borders of the state.

The project staff operates within the Engineering Experiment Station of West Virginia University and includes a project director, engineer-geologist, assistant geologist, field assistant and a stenographer. This staff is headquartered on the campus of the university, using an automobile and a jeep for field work. Special equipment includes a stereocomparograph, stereoviewers, duplicating machines and a vari-typewriter for lettering all map tracings. Test equipment belonging to the State Road Commission's Department of Tests & Materials is used for performing the Los Angeles Abrasion Test.

Geologically and physiographically West Virginia can be divided into two distinct sections. The eastern one-third of the state is located within the Ridge and Valley physiographic province. This area contains older formations of sandstones, shales and limestones that have been folded and faulted. The topography of this area is influenced by folding and the hardness of the rocks. A direct result of folding has been a metamorphosis of some of the strata into a more durable rock that is desirable for use in highway construction.

In contrast, the western two-thirds of the state is located within the Appalachian Plateau physiographic province. The rocks in this area consist of sandstones, shales, coal horizons, thin limestones and red shales. These red shales generally represent replacement of the limestone horizons over most of this area. Practically all rock formations in this area are gradational, both horizontally and vertically. Gradation may take place within a very few feet, thus increasing the difficulty of making predictions over large areas. The axis of the Appalachian geosyncline passes through this area. This massive subsidence represents a broad basin of sediments that thicken to the south by as much as 50 ft. per mile. Limestone formations in the north are gradually replaced by calcareous red shales in the southern part of the basin.

Separating the two provinces is a transition area in the form of an eastward facing escarpment known as the Allegheny Front. This transition area represents the separation between the older, strongly folded, harder rocks to the east, and the younger, nearly flat-lying and somewhat softer rock to the west.

Rock suitable for crushing is the major source of aggregate material for West Virginia. At present, the most commonly used material is limestone

which is shipped all over the state from quarries located in eastern West Virginia. Local sandstones have been used on occasion as fill material and for secondary roads. Because of the wide geographical distribution of sandstone within the State, it is felt that this material will find wide application as base course material, providing it meets specifications. This project has attempted to sample and test all local material that would possibly meet specifications, whether it be sandstone, shale or limestone. Also, an attempt has been made to locate suitable and acceptable material within the maximum haulage distance.

Sand and gravel washed down from Pleistocene glaciated areas to the north is dredged from the Ohio River. Since this river forms the western boundary of West Virginia, sand and gravel can be economically delivered by barge to adjoining counties.

Fifty pounds of rock removed with a sledge hammer is a typical physical sampling, collected wherever sufficient material is available and conditions are suitable for quarrying. Whenever possible, sources are spotted at intervals so that maximum radius haulage distance to the construction site will not be greater than 5 miles. While at the sample location, an on-the-spot description is made listing size of deposit, amount of overburden, available utilities, interference, haulage road conditions and any other pertinent remarks considered necessary.

In some cases rock deposits were found con-
Please turn page

View of office shows stereoscope (Aero Service Corp.), stereocomparograph (Fairchild Aviation Co.), and drafting machine (B. K. Elliott Co.)



W. Va. sizes up the aggregates situation

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Jeep at abandoned roadside quarry, Ohio County, W. Va.
(Sample 35-1-4)

taining well-defined layers of shale, coal or other materials not suited for use as aggregates. Where it appeared that these materials could be separated during quarrying operations, the deposit was sampled on the basis of potentially acceptable rock material only.

These samples are then transported to the State Road Commission Testing Laboratory where they are subjected to the Los Angeles Abrasion Test, B Grade (AASHO T96-49) as performed in West Virginia. This is the only test presently performed on these samples. The test equipment used consists of a jaw crusher, vibrating screens, balance scale and a motor-driven rotating drum containing 11 steel balls.

Briefly, the Los Angeles Abrasion Test consists of crushing the sample, placing measured quantities of selected sizes from the crushing operation into the drum, and determining the attrition due to rotating the drum. The attrition, or "percent of wear," is determined by a screen analysis of the sample after 500 revolutions of the drum.

Future aggregate prospecting may well employ additional methods. Earth resistivity surveys have been conducted by others, although it is reported that this method is not adaptable to West Virginia's relatively flat-lying rocks because of their variable degrees of interbedding. A new seismic procedure has been placed on the market which does not require drilling and blasting. This may prove useful. Correlation drilling will have to be used in areas where the other means prove to be inadequate.

Early in the life of the project the value of

aerial photography was realized. The rugged topography of West Virginia made the use of aerial photos a "must" for thorough coverage.

The photos serve the project in three ways. (1) A preliminary stereoscopic viewing is made of an area into which a field trip is contemplated. From this study numerous outcrops and potential material locations that might otherwise go undetected in the field are pinpointed. The photos provide a view of the other side of the mountains, and in areas that are presently inaccessible. (2) The use of aerial photos in the field, combined with observation of the outcrops, results in more accurate plotting of sample locations. (3) In areas of flat-lying rock formations, the exposures are noted and the formation outlines can be traced onto data sheets by means of the stereocomparagraph.

The maps, data sheets and written reports prepared by the project are all of its own devising. Surface-geology type maps, scaled one inch per mile, superimpose surface features such as main highways, towns and rivers on the aerial geology. The aerial geology outlines the formations at or near the surface of the earth that would be exposed if all soil cover and vegetation were removed. Most cultural details and secondary roads are omitted, except at sample locations, to minimize obscuring geologic clarity. Aggregate material information is added to complete the map. All lettering of the maps is done on a vari-typewriter machine for purposes of speed and uniformity.

A separate data sheet is prepared for each sample location. Its information is compiled from personal observation, stereoscopic study of aerial photographs, available reference material, physical sampling and testing. Interested parties can easily discover details on location, utilization, deadhaul, probable quantities, working conditions, geologic information and test data. Part of each sheet is reserved for a sketch of the probable outcrop pattern, derived from aerial photos.

A written report completes the information, elaborating on the descriptive geology of the area. Native rocks are described thoroughly enough for field identification and recommendations are made for their removal. Also included are a bibliography, a generalized stratigraphic column for the region and a list of aerial photographs and topographic maps.

West Virginia is providing this data for each State Road Commission District in the state. A painstaking survey program such as this can reduce confusion, delay and expense.

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COMPACT DESIGN of Dundee Cement Co. plant near Dundee, Michigan, cuts total traveling distance of raw material from primary crusher to packing plant to only 4,000 feet.

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Huge as it is, the \$25,000,000 plant is completely operated by just four control panels. What's more—the design permits doubling plant capacity without altering any present installations.

Keeping this vast complex of highly automated equipment running efficiently calls for a lubrication program that is simple, complete, and virtually foolproof. Dundee chose Texaco to help them with the job.

With Texaco's Organized Lubrication Plan as a framework, Texaco and Dundee engineers worked out the right lubricants for every piece of equipment.

A Texaco Lubrication Engineer will gladly show you how Texaco's Organized Lubrication Plan can fit into your operation...how it can mean greater efficiency and maintenance economies. Call the nearest of the more than 2,300 Texaco Distributing Plants, or write Texaco Inc., 135 East 42nd Street, New York 17, N.Y.

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Aggregates production at dams—

Part 2:^{} “Modern” processes pass test at Hoover Dam*

by Walter B. Lenhart

HOOVER DAM is one of the outstanding construction projects of the age. It is considered a near perfect dam in a near perfect setting, and the aggregates production facilities installed to supply it during its building lived up to the image of the project itself.

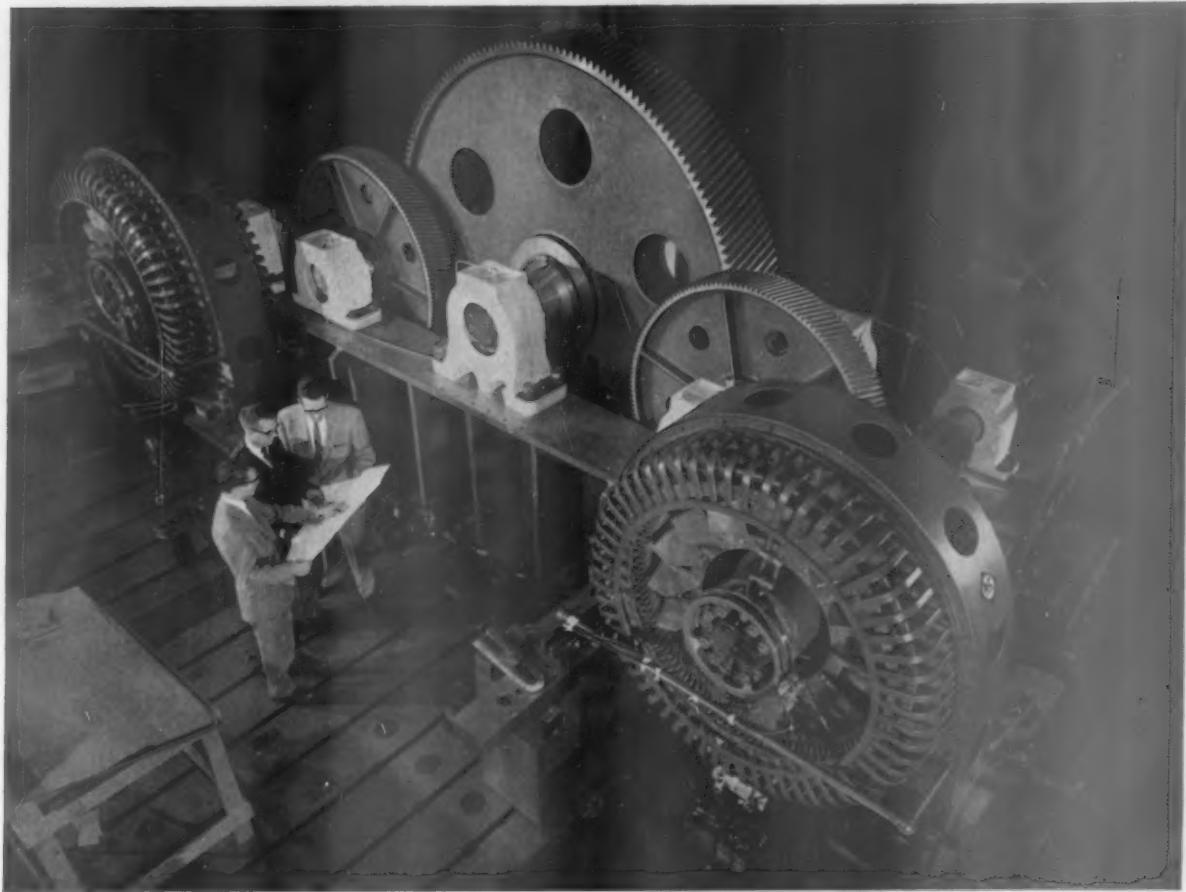
Built above the dam site, the all-steel plant was put to unique service. It supplied materials for construction to strict specifications during the building of the lower half of the dam. At the same time, it produced sufficient specification materials to supply a 7 million ton stockpile located at a higher level. Wash water for the plant came from the Colorado River and had to be treated. A transportation problem was involved, since the aggregate source was on one side and the processing plant was on the other side of the deep river canyon. Capacity of the plant was 16.5 tons per min.

Please turn to page 104

*See, also, Part 1. *New techniques born on early jobs*, in the July 1961 issue of *ROCK PRODUCTS*, page 88

Hoover Dam, built during the 30's, contains 8 million tons of aggregates produced to rigid specifications

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Twinducer is an Allis-Chalmers trademark.

Full-load demonstration proves 98%-plus efficiency of Twinducer grinding mill drive

New, twin-motor drive system divides mill load electrically, saves space and installation costs, extends gear-train life.

To show the high efficiency of the Twinducer drive, Allis-Chalmers engineers recently conducted a series of full-load demonstrations at the factory.

Full load was simulated by coupling two Twinducer drives. Driver unit was coupled to driven unit. Load on driven unit was two equally loaded generators.

Power input to the motors was measured, and compared with the output of the generators. Efficiencies (exclusive of ordinary motor and

generator power losses) were found to range from 98.48% to 98.52% . . . more than twice the efficiency of most conventional mill drives.

The Twinducer drive balances the load electrically, through a unique, angular rotor shift of one motor. Result is a drive arrangement that takes less space than other trunnion drives . . . and facilitates automation of grinding equipment. Twinducer drive cuts maintenance costs, conserves power requirements and greatly extends gear-train life.

For complete information on the new Twinducer drive system, see your A-C representative. Or write **Allis-Chalmers**, Industrial Equipment Division, Milwaukee 1, Wis.

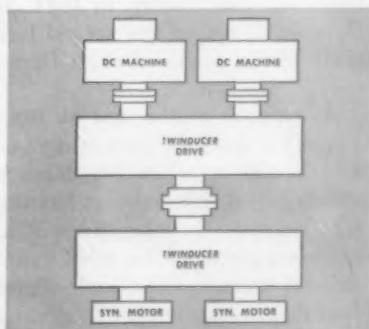


Diagram of Twinducer drive demonstration. Load is balanced electrically by a rotor shift mechanism in one of the twin synchronous drive motors. A-1514

Enter 1031 on Reader Card

ROCK PRODUCTS, August, 1961

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Aggregates production at dams . . .

continued from page 102

The proposal to build Hoover Dam met with much opposition. Opponents of public power voiced strong objection to it, since huge amounts of electric power were to be generated at the dam and sold by a federal agency. But another project, proposed about the same time, more than met the original objections. A Metropolitan Water District was organized to bring domestic water into southern California, and plans for it required a vast amount of electric power to pump water. In fact, virtually all of the initial power to be generated at Hoover and allotted to California would be needed for the water project and, thus, would not be available to compete with private power utilities. These objections having been successfully met, final plans to build Hoover Dam went ahead full blast.

Hoover was projected as a structure 726.4 ft. high and to contain 4.4-million cu. yd. of concrete. It was to be the largest concrete dam in the world. By comparison, dams built before 1931 were relatively small; aggregate production, in most cases, was not considered an important part of these early projects. During the 1905-1931 period, the U. S. Bureau of Reclamation built 11 dirt-fill dams that ranged in height from 51 to 223 ft., and all impounded less than 2 million acre feet of water. One modern dirt-fill dam (Trinity, in California) has a rated capacity of 2.5 million acre feet of water.

Six concrete arch-gravity dams were built in this 27-year period, and four were built of cyclopian concrete. Their heights ranged from 88 to 417 ft. Roosevelt Dam, built of cyclopian concrete, formed the largest reservoir of all dams built during this period—1.398 million acre feet of water. This type of dam required the largest yardage of concrete of all types; Elephant Butte Dam, the biggest of its type, took 605,000 cu. yd.

The era of big dams got underway when Hoover Dam was started. Grand Coulee Dam, the giant of them all, was started in 1934. Then came Shasta Dam—containing the second largest mass of concrete in the world—Friant Dam and others.

Aggregate production at the dam site became a really important part of dam construction in the middle 1930's, when big dams were the order of the day. But it started at Hoover Dam. That project elevated the importance of aggregates processing to a point where, even today, it would be considered ultra-modern and efficient in turning out specification materials in great volumes.

The adventure into building the world's highest concrete arch-gravity dam was a serious business. One of America's largest, most turbulent and

unpredictable rivers had to be subdued. Only a dam of maximum strength, stability and durability could do the job. Liberal use of portland cement (avg. 4.08 bags per cu. yd.), careful watchfulness on the part of an army of inspectors, and skill of the builders resulted in a dam of great beauty, strength and usefulness.

Located not far from Las Vegas, Nev., Hoover Dam rises to a height of 726.4 ft. Its base thickness is 660 ft., giving it a base-height ratio of 0.90. No other concrete arch-gravity dam has such a high ratio.

No substandard material of any kind was tolerated in the building of Hoover Dam. Although the mass of concrete was not reinforced, 22,500 tons of metal were used in various parts of the structure. Embedded in the concrete also were 840 miles (3,350 tons) of metal cooling pipes through which ice water was circulated to cool the setting concrete. This total of 25,850 tons of metal acted somewhat as reinforcing. Use of the cooling pipes was a "first" for the Bureau of Reclamation in dam construction. It is claimed that no other cooling system devised to date has been nearly so efficient.

Aggregates were dug from pits on the Arizona side of the Colorado river. The washing and screening plant was on the other, or Nevada side. A standard-gauge railroad system delivered the pit-run material to the plant over a bridge spanning the river, in 30-cu. yd. cars. Originally, a 5-cu.

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Last month, Mr. Lenhart discussed the history of aggregates and processing equipment at U. S. dams. He highlighted the fact that many processing techniques that we now consider effective originated at plants built to supply aggregates for dam construction. In this, his second article in the series, he tells how the Hoover Dam (Boulder) project was among the first to give a real stimulus to the development and application of those techniques

—The Editors



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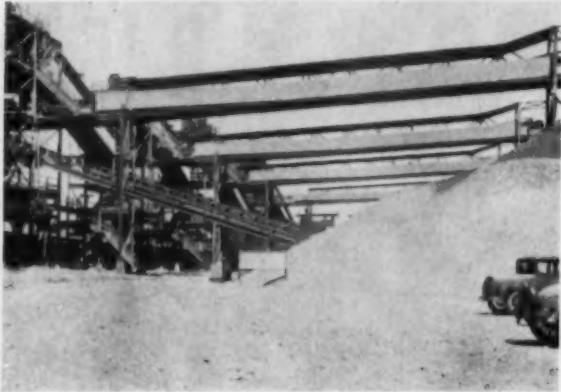
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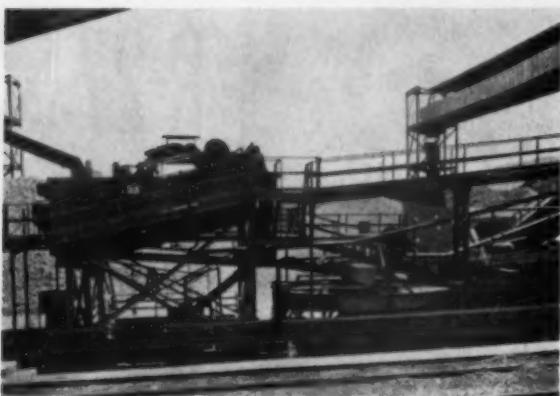
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Aggregates production at dams . . .



All-steel plant supplied gravel, sand and cobbles at the rate of 1,000 tons per hour



Sand was prepared in rake classifier (upper left) and bowl classifier (below)

yd. dragline was used for digging material from the pits. Later, when plant capacity was increased, more digging units were put to work.

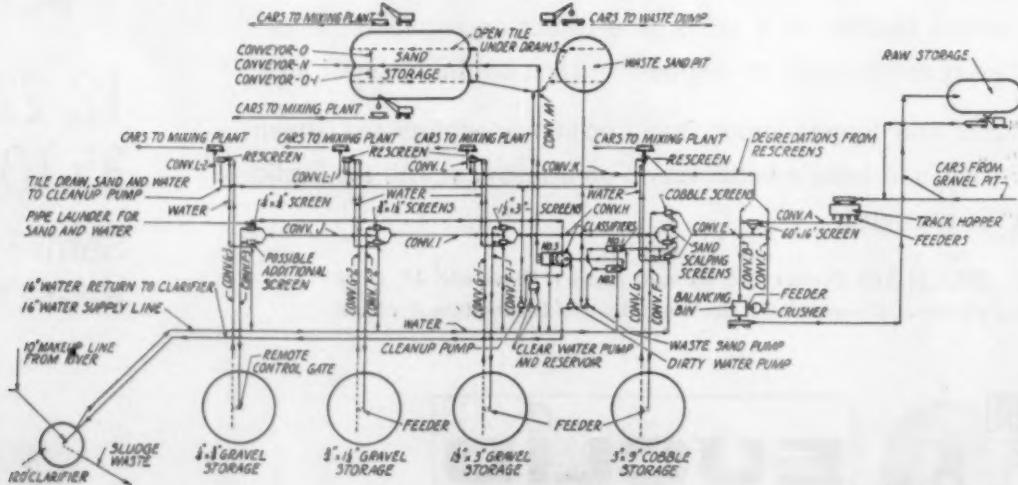
Top size of aggregates used in Hoover Dam was 9 in. On the plant side of the river, raw material was first processed in a heavy-duty rotary screen that had 8-in. square openings in the perforated steel plate jacket. Oversize was crushed in a 16-in. gyratory crusher, which operated in closed circuit with the rotary screen. Aggregates were further sized and processed on wet vibrating screens.

Specifications for sizes of aggregates used at Hoover follow present concrete dam construction practice, except for the 9-in. top size requirement. These sizes were made at the aggregates plant: 9 x 3 in., 3 x 1½ in., 1½ x ¾ in., ¾ x 1¼ in., minus ¼-in. sand. The original ROCK PRODUCTS story on the plant (Aug. 27, 1932, issue) pointed up an unusual materials handling process. It stated that the larger sizes of aggregate ". . . cascaded down a baffle arrangement known as a stone ladder . . ." This probably was another "first" application of a piece of equipment to the aggregates industry.

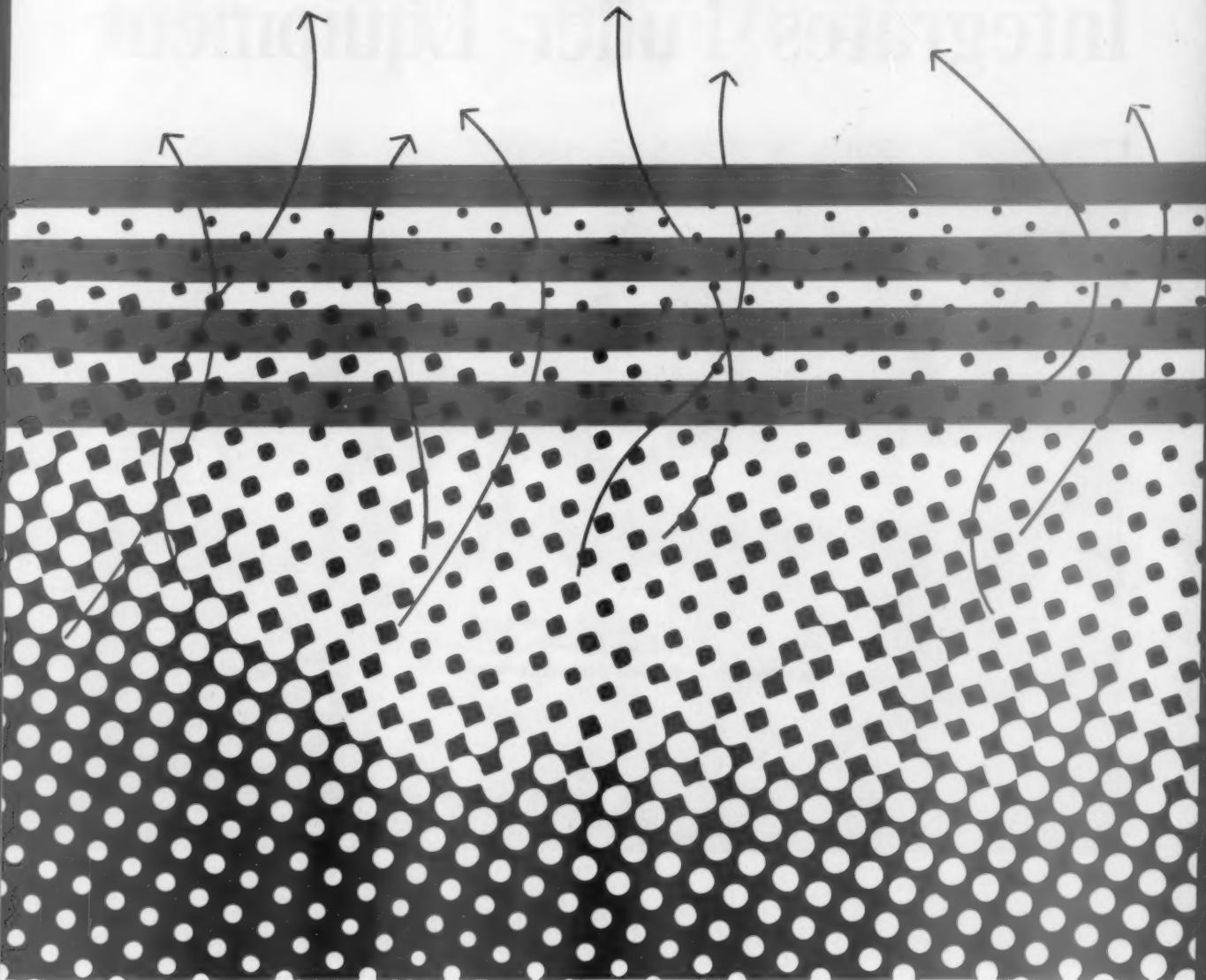
Sand was prepared in a battery of three classifiers, two of which were the rake type and one a bowl type. The first rake processed a $\frac{1}{4}$ in. x 28-mesh product. Overflow from that unit went to the second rake, which prepared a 28 x 48-mesh product. The third classifier, the bowl, received overflow from the second rake and processed a minus 48-mesh product. The three classifier sizes were blended on a belt conveyor. Excess sizes could be

Please turn to page 124

Flow diagram of Hoover Dam plant



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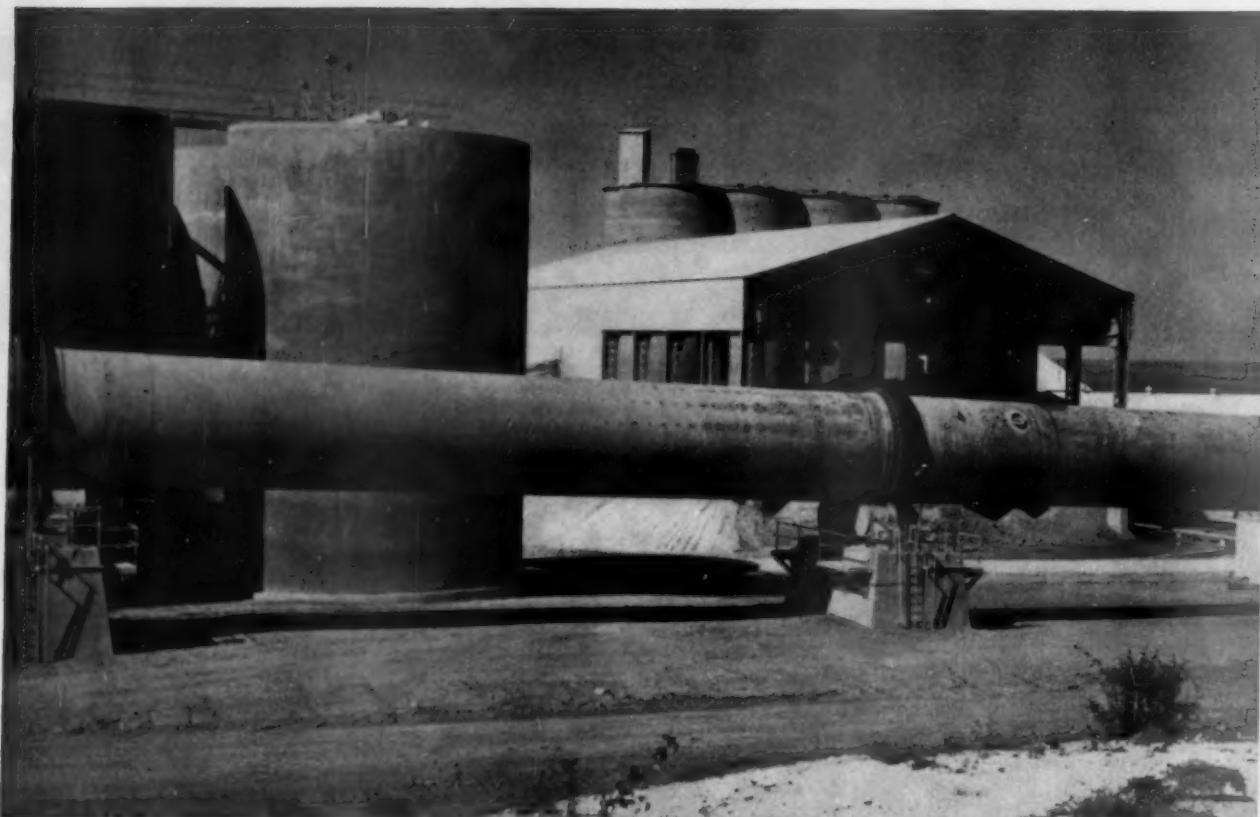
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New 4,000 BBL/Day Cement Plant Integrates Fuller Equipment



Texas Industries of Dallas Achieves Unusually Low Capital Outlay And Operations Economy By Specifying Quality Equipment

Designing on the basis that true economy in cement plant design considers operation and maintenance costs along with capital outlay, Texas Industries, Inc., with its consulting engineers, selected Fuller equipment for its new cement plant at Midlothian, Texas.

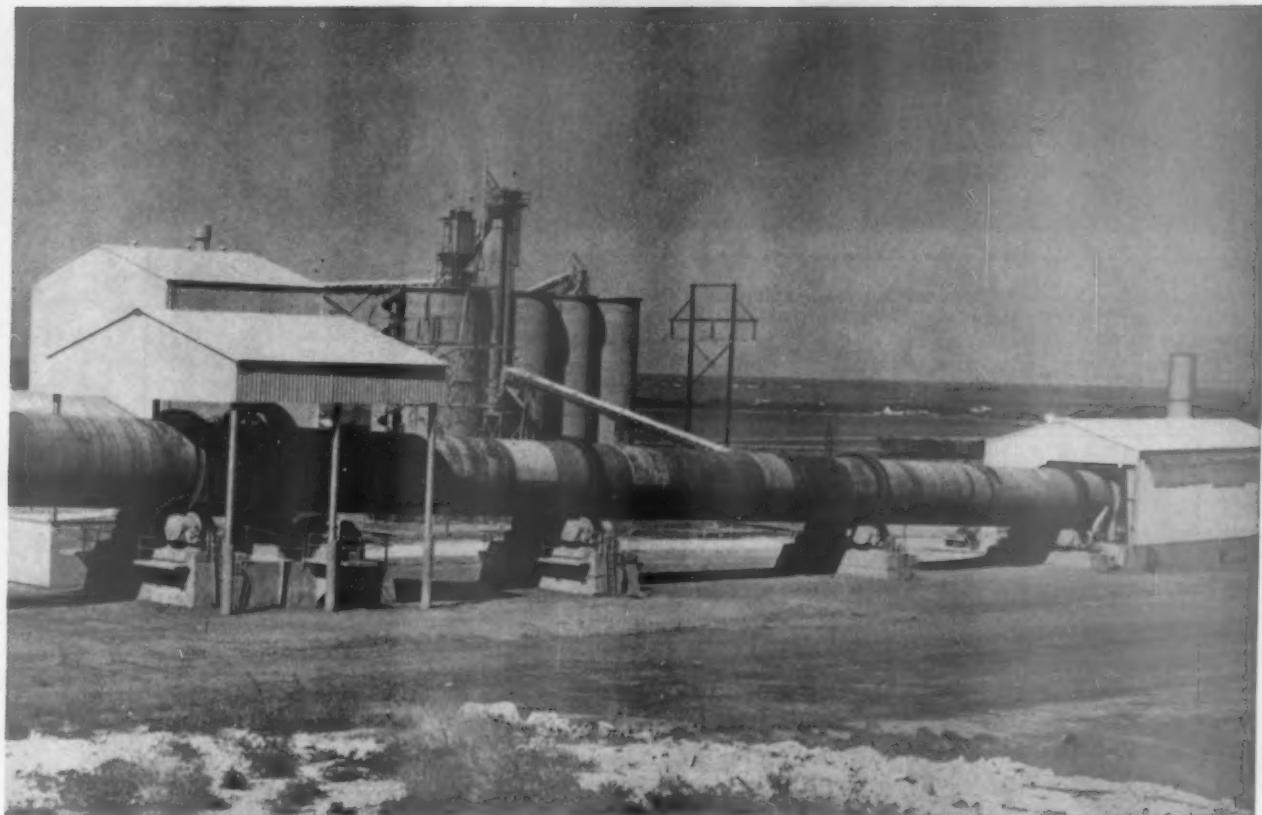
To meet specifications, the following major equipment items were integrated into this modern wet process plant: a Traylor 12 x 450 rotary kiln, a Fuller 8 x 44 horizontal grate cooler, a Traylor 1,500 HP raw mill and a 2,000 HP finish mill, in addition to Dracco multibag dust collectors, Fuller-Kinyon and Airslide fluidizing conveying systems, Fuller rotary compressors, Sutorbilt blowers, Lehigh induced draft fans, Fuller control panels, and auxiliary items.

Unified responsibility provided by Fuller helped to effect simplification of plant design and layout. The result: improved engineering liaison and procurement; significant savings in capital outlay and efficient operation.

Fuller's wide range of major cement plant components provides these advantages for leading cement producers. Behind the quality and systems compatibility of Fuller cement plant equipment is a coordinated research effort. The Fuller Research Department has made significant contributions to the industry. Investigate how Fuller unified responsibility and experience can mean substantial savings in capital costs and increased operational efficiency for you.

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A collapsible kayak served the author for both sailing and fishing during a visit to Blubber Bay, up the British Columbia coast, during the 40's



Back in the early 20's, Mr. Azbe took his first flight. Here, dressed in the complicated flying garb of that era, he waits to go up with pilot friend Major Wassal (far left)



This 34½-lb. King salmon earned a membership in the elite Tyee Fishing Club. It's easy to see that the author's visits to Pacific Lime Co., Ltd., were far from being all work



After loop-the-loops, barrel rolls and tail spins, the National Guard trainer made it safely back to terra firma. Far from being daunted, the author remained an eager flying enthusiast

Victor Azbe's Colorful Career in Lime— Adventures & Highlights



As proof of his aviation interest, Mr. Azbe was instrumental in establishing the "Spirit of St. Louis" gold medal, the aeronautical award of the American Society of Mechanical Engineers. Will Rogers was one of the early recipients which, to date, number 11

*Recessions, world tensions in 1960 slowed but never halted
the need to solve lime production problems
all over the free world*

Lime technology moves ahead

by Victor J. Azbe

1960 WAS A typically active, diversified year for the Azbe Corp. Personal consultation on kilns and lime processing was provided in seven foreign countries—Austria, Italy, Germany, Sweden, Norway, Brazil and Argentina. By correspondence I advised companies in Australia, India, Uganda, South Africa, France, Israel, Japan, Colombia and Venezuela. And on the home front I spent time at installations in Idaho, Illinois, Michigan, New Mexico, Colorado, Texas and Pennsylvania. It is difficult to imagine the tremendous variations in size, equipment, efficiency, production, raw material and techniques.

Too, 1960 was the year in which I encountered the worst performing, but most revealing, rotary kiln installation in my experience. It was located in the Southwest and presented some challenging problems that taught me more than any rotary of my previous experience. The first was the fact that, although it was a simple heating up process of near to no chemical reaction, the kiln simply could not bring the calcine to the desired 2,800 deg. F. Radiation, or wall loss, seemed to be the obvious answer. But let me start from the beginning.

In relation to what it had to do, the kiln was very large—and that turned out to be the whole trouble. The length was 165½ ft.; average diam., 8.7 ft. The hot section diameter was 9 ft. 6 in. and there was no separate preheating section, but the kiln had a rotary cooler adjoining.

On arrival at the firing floor, I looked for the usual colored sight glass, but there was none and it was not needed. The hot zone could be examined with impunity. The flame lacked the usual blinding brilliancy; it was hot but dead, transparent and nonradianant.

The temperature of the escaping gases was

1,200 deg., analysis was zero oxygen, and only a very small amount of combustible as a reducing atmosphere was demanded. If it had been an efficient kiln this would have been almost perfect, but it was very inefficient and, therefore, the waste gas temperature should have been much higher. As matters stood, I would not have been surprised if they had told me the waste gas temperature was 1,800 deg. But no doubt it was a relative 1,200 deg.

Probably no one knows what the waste gas temperature of his rotary is, and by this I do not mean that the average may not be known, as there are streams of different temperatures pouring out. But it is impossible to obtain the correct temperature. A heavily protected thermocouple of large area gathers heat by convection from the junction, but it loses heat by radiation to the much cooler dust chamber, to the still cooler feed pipe and to the cold stone bed.

Temperature indications would only be correct if the recorder would be of the potentiometer type, if the thermocouple were bare and of no diameter or near to it, or if the couple would be of high-velocity type, drawing the hot gas over the junction at a rate where the heat delivered by convection would equal that lost by radiation. Since this process may not be entirely practical to use, the temperature is possibly a couple hundred degrees higher than recorded. It seems that all temperature recorders should be corrected for divergence and set using a small bare wire thermocouple.

When I called the kiln the worst, I meant the worst-performing rotary kiln. As a kiln it was normal, and its operation was better than most. The poor results were due to the fact that they did not

Please turn page

Lime technology moves ahead

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have more of the particular calcine to pass through. The kiln "idled" on the lime, which brought the usually hidden radiation loss into prominence. I aim to demonstrate the seriousness of this loss, as it is equally present but submerged on all rotary kilns.

As there was not enough calcine coming down the kiln to account for the pronounced cooling of the gases passing up, it must be construed that their cooling was by kiln external radiation. Thus, since the gases arrived at the exit abnormally cooled, it must be assumed that the calcine arrived in the hot zone inadequately preheated.

On the other end, the calcine leaving the cooler was still warm, as usual, and the heat from the cooling taking place was mostly lost by radiation from the shell of the cooler. Even if they had an effective cooler, proper hot zone temperature could not have been attained. The heat received from the small amount of calcine, if returned to the hot zone, would not have offset the greatly increased radiation loss occurring at the higher temperatures desired.

They could have attained higher temperature by burning still more gas to offset the radiation loss, but then the loss would have greatly increased. Besides, they claimed they were giving the kiln all the gas they had.

The 36 million Btu. in Table I for heating the calcine is equivalent to four tons of lime. But since only sensible heat was involved, recoverable in the cooler, that must be charged to radiation as well as everything else, including the heat in the combustion products. If any one disputes this, I am

Table I—Heat balance

Heat applied	Million Btu.'s per day	Percent
Latent heat of water vapor	57	10
Heat to calcine	36	6.3
Products of combustion of 1,200 deg.	150	26.3
Radiation loss by difference	327	57.4
Total	570	100

willing to consider the 6.3 percent of heat to calcine and 26.3 percent of all products of combustion as useful and the remainder radiation loss at 91.4 percent. But since there were no endothermic heat requirements, radiation loss was 100 percent.

True, much of the kiln lining was basic. On the other hand, the kiln was not up to the temperature of the normal lime kiln—3,000 deg. F. peak temperature and 1,600 deg. F. rear end temperature. The heat loss by this kiln per square foot of surface in radiation and consequential losses just about equals some of our latest and largest kilns.

The kiln shell surface was 4,040 sq. ft., and heat input was 570 million per day, or 141,000 Btu. per sq. ft. per day. We are prorating the loss to the kiln shell surface proper.

The heat lost by radiation is the best heat the kiln has available, and its loss enfeebles it by something like half. But rotary kiln radiation loss is not only the wall loss. It consists of several additional parts.

(1) Direct radiation loss of a kiln is all heat necessary to keep the kiln at full operating temperature. This would include all heat losses by convection, conduction and radiation from all openings and all external surfaces of the shell proper, the cooler, the mill and their connecting surfaces. In the case of lime kilns, most often all this heat will be of high temperature elevation capable of calcining.

(2) An additional loss will be the low temperature heat companion of the above high temperature level heat loss; that is, all heat loss from the calcining zone by the products of combustion involved in the generation of the heat loss by radiation item (1) above. None of this heat is recoverable by any stone preheating scheme, as the calcining heat stream carries its own stone preheating component.

(3) As rotary kiln gases escape the calcining zone at around 2,100 deg. F., when they leave the kiln at around 1,600 deg. we must assume that the gaseous component of the radiation loss (2) above escapes at 2,100 deg. F.

Please turn to page 114



J. C. Miller (right) receives a check for \$1,000 as first winner of the Azbe Lime Award

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Lime technology moves ahead

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(4) There is still another element to the radiation loss, indirect but nevertheless quite serious. Any loss of heat by radiation from any section of the kiln has as its prime source the point of highest temperature within its environment. We may be losing heat from the surface of the shell, but actually we are losing it from the hottest flame of that section in a sort of chain action.

Heat transfer in a rotary kiln is mostly by radiation. If the glowing carbon from the wall to the bed would vary as the fourth power of absolute temperature difference, it would have a great heating effect. Waste heat from the kiln outer surface lowers the flame temperature and "decapitates" the most effective levels of radiant heat transfer power. This is followed by a series of effects, all culminating in the increase of combustion products escaping to the stack. There is an increase in temperature, all due to the radiation loss and, thus, chargeable to it. For a given production it also means larger kilns that, in turn, increase the loss.

The lowering of hot zone temperatures through heat loss increases the exhaust gas temperature. Any waste at the calcining end reduces the amount of lime which, in turn, reduces the amount of stone and raises the temperature at the rear, because it is the stone that cools the gases.

The low temperature level component of the calcining stream is used for the preheating of the stone that the high level component calcined. The low level component of the wall loss stream does not have the stone to cool it and the heat is not

recoverable by any means. Thus, stone preheaters that increase radiation loss of a kiln defeat themselves, and so does an over-long kiln. They are trying to save something that is doomed to be wasted. The best way to save heat at the back is to save heat at the front of the kiln.

When losing heat in case of lime kilns by radiation, it is the high level heat that is lost from the shell surface which produces lime at the rate of 1,300 Btu. per lb., and the loss of 141,000 Btu. per sq. ft. would represent about 110 lb. of lime lost. With this kiln in the Southwest it would be better to substitute one about one-fourth (or less) the size.

In Table II we feature three kilns: M3 producing 350 tons of lime per day; W4 producing 410 tons of lime, and the Southwestern kiln producing nothing. We apply the Southwestern radiation loss factor of 141,000 Btu. per sq. ft. of shell area to the two active lime kilns. In their case, this loss is all heat of high elevation and in lime about equal to production.

In the case of M3, the loss in lime is 321 tons as compared to a production of 350. In the case of W4, the loss is 443 against a production of 410 tons per day.

Let us approach it differently; that is, by way of the heat balance. Start out with the radiation loss as ordinarily calculated, add the portion of combustion products stack loss, add the loss due to enfeeblement of heat transfer and rise of escaping gas temperature, and we come to about the same answer.

A rotary kiln produces lime for 5 million Btu. and less, just like a vertical kiln. That it requires 7 million and more is due to losses attendant to shell radiation. They should not be considered as just a heat loss but, rather, as a production loss; on a good kiln, the loss would probably equal that of production.

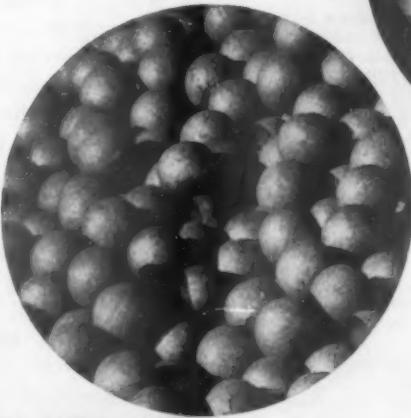
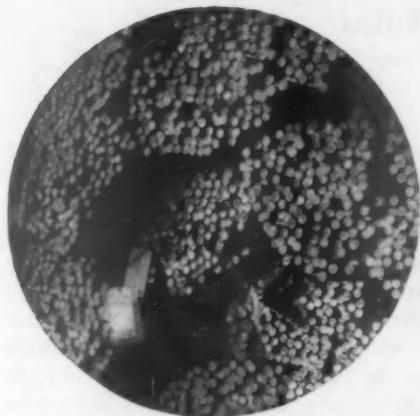
Other worthwhile discoveries were made last year. In Brazil I worked on a set of kilns burning wood—each over 30 cords a day. But, at the same time, they produced 120 tons of lime. Too, arrangements have been made to alternate and combine fuels, such as natural gas and fuel oil. The latest under consideration is to use the waste from distillation of essential oils from coffee. This could be applied like pulverized coal to shaft kilns under a system now successful with fuel oil.

Work was done on shaft kilns for sintering dolomite and magnesite. Under certain conditions,

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Table II—Radiation loss basis of production

	Kiln		
	M 3	W 4	Southwestern
1 Production-ton of lime per day	350	410	—
2 Size, ft.	9x210	10x260	8.5x165.5
3 Internal volume, cu. ft.	10,550	16,538	5,768
4 External surface (shell), sq. ft.	5,930	8,168	4,040
5 Total heat per day, million Btu.	2,625	2,993	570
6 Heat per ton of lime, million Btu.	7.5	7.3	—
7 Radiation loss per sq. ft. per day, Btu.	141,000	141,000	141,000
8 Radiation and consequential loss per day, million Btu.	836	1,151	570
9 Radiation and consequential loss in tons of lime at 2.6 million	321	443	—
10 Radiation loss basis of total heat, percent	31.8	38	—
11 Radiation loss basis of production, percent, in tons of lime per day	92	108	—



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ROCK PRODUCTS, August, 1961

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last longer... work efficiently...
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R-1 MOTORIZED TIPPING VALVE with WP "flap" closures (shown) is used in Positive Pressure installations up to 20" WVC; Negative to 30" WVC; especially where dust is too light to operate Gravity-Operated model.

GRAVITY-OPERATED TIPPING VALVE is ideal for sealing negative pressure dust collector hoppers handling dry, free-flowing material, and not requiring positive time-cycle operation.

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WESTERN PRECIPITATION

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Rocky's Notes

continued from page 21

Hence, one of the big problems in the use of chemical control of plant disease and pests is that of possibly destroying at the same time the beneficial life of the soil. Some of these chemicals are so poisonous that one shudders at the idea of their being incorporated in the soil, and in the soil waters that eventually are used for our city water supplies. For example, some of these chemicals contain compounds of arsenic, lead, mercury, to name only a few. Some are so dangerous even to apply that it is supposed to be done only by specialists. Of course, the U. S. Department of Agriculture is authorized to see that such chemicals are not applied in "dangerous" amounts, so far as animal and human consumption is concerned, but admittedly no one knows the cumulative effects of continuously absorbing even minute amounts of such poisons through our food and drinking water.

Lime producers will be interested to know that while a lime-sulphur spray has been largely replaced as an insecticide by more powerful modern ones, it is still recommended for use on certain trees, especially fruit and nut trees. It has the advantage of being the most harmless to human beings.

Market for Fine Sand: One thing we learned is about a new market for sand. A certain grading of fine sand is one of the best protections against termites. The following is a quotation from p. 209: "Ebeling and Pense (1957) found that the western subterranean termites tunneled rapidly through moist sand 50 to 100-mesh size. They could not, however, tunnel through dry sand of small particle size, because the tunnels collapsed. They could work through dry sand of larger particle size (above 3 mm. in diameter) by passing through the interstices. In moist sand the particles are mixed in the mouth [of the termite] with a gluey substance, and then placed along the walls of the tunnel to make a smooth tight surface. Sand with particles ranging in size so that not more than 5 percent will be retained on a 10-mesh screen, and not more than 5 percent will pass through a 16-mesh screen, forms an impenetrable screen to subterranean termites. By tamping the sand to reduce the size of the space between the larger particles, more variation is possible in the range of effective particle size. Fillings of the desired range in particle size of sand, crushed volcanic cinders and finely divided slag are being experimented with for sealing off earth fills under porches and steps."

END



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Company _____

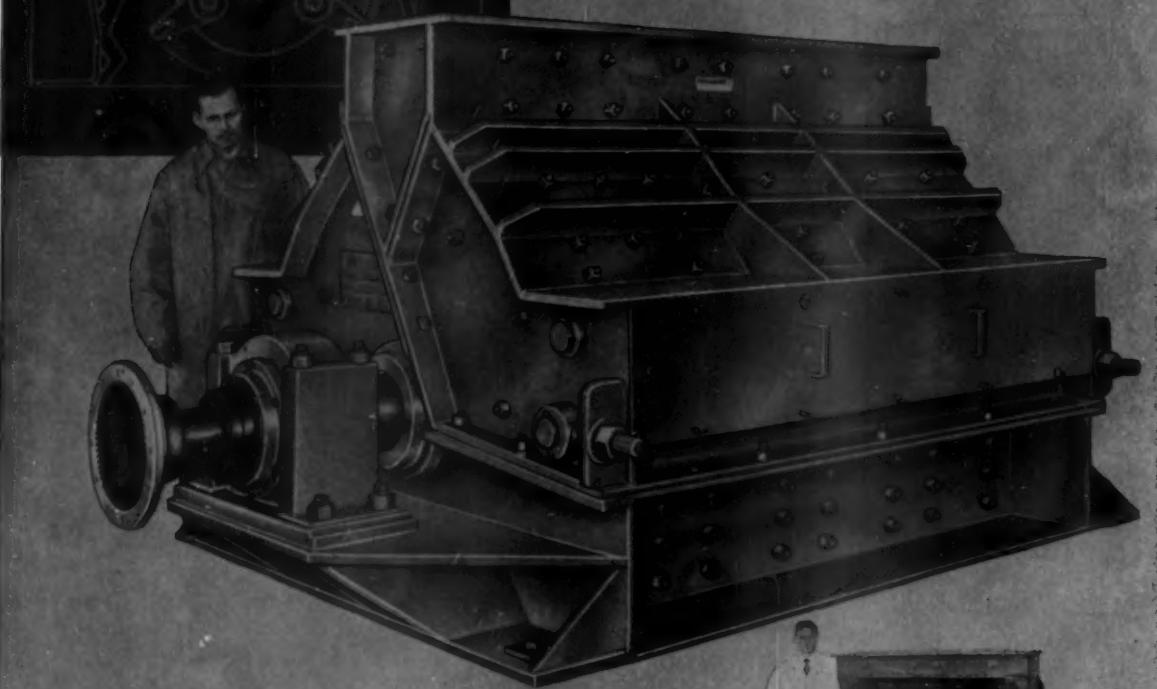
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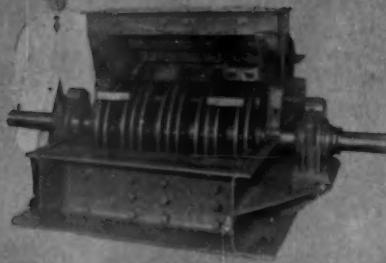
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Internal view showing manganese steel impact blocks, hammers and liners. Rugged, heavy steel plate construction. Extra large shafts are mounted in oversize bearings sealed in self-aligning housings.

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Statistical tools monitor . . .

continued from page 94

expression of firing rate and flame shape. However, it correlates well as a parameter when the kiln is not over or underfired and for control purposes it tends toward basic firing rates.

Where deviations of the parameter from actual liter-weight tests have been noted, this simple ratio is a superior operational index. Since it tracks with liter-weight tests, other conditions being constant, the method is still referred to as "liter-weight parameter."

There is a common tendency to associate higher secondary air temperatures with fine clinker, due to greater surface area per pound and more rapid heat release as a result.

However, reference to composite Fig. 5 shows that the clinker is not just momentarily involved with secondary air preheating, but must sustain its heat release over a period of several minutes. The ability of the clinker to sustain this heat release is important, as air from the latter portion of the preheat zone is a full part of the average secondary air temperature.

The rapid heat release of fine clinker is offset by the slower, more sustained heat release of coarse clinker. Consequently, variation of clinker size by itself has little effect on secondary air temperature. This is indirectly confirmed by the fact that a large part of the secondary air temperature variation is traceable to variation of kiln discharge rate, and most of the remainder can be attributed to variation of clinker heat (Figs. 2 and 3).

Variation of clinker size has little effect on sec-
Please turn to page 121



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Statistical tools monitor . . .

continued from page 119

ondary air temperature, although it is true that coarser clinker will permit more air to flow, thus causing an over-supply of air to the firing hood: And the reverse is also true. Consequently, it is an advantage to provide a firing hood pressure controller to automatically adjust the cooler fan dampers.

A result of damper control is to provide the kiln with what secondary air it requires to stabilize air leakage into or out of various firing hood openings. The cooler dampers automatically compensate for changes of clinker bed permeability.

Change of kiln draft and consequent air flow through the cooler will affect the parameter. However, draft variances generally appear to be small and negligible in comparison with the principal factors affecting the parameter. Where this is not the case, a draft factor may be introduced into the parameter equation.

The coolers so far tested for parameter control have been equipped only with firing hood pressure-cooler fan damper control with no overgrate baffle. The waste air dampers were manually set. While the results have been very satisfactory, automatic, simultaneous and opposite operation of the cooler

and waste air dampers as well as an overgrate baffle will more sharply divide the secondary and waste airs and provide parameter definition.

The bed-depth control has a high degree of stability, as it is concerned only with bed depth and controls it directly. Most undergrate pressure controls indirectly seek similar bed depth objectives with the compounding of a temperature factor. (Both types of control should incorporate firing hood pressure control).

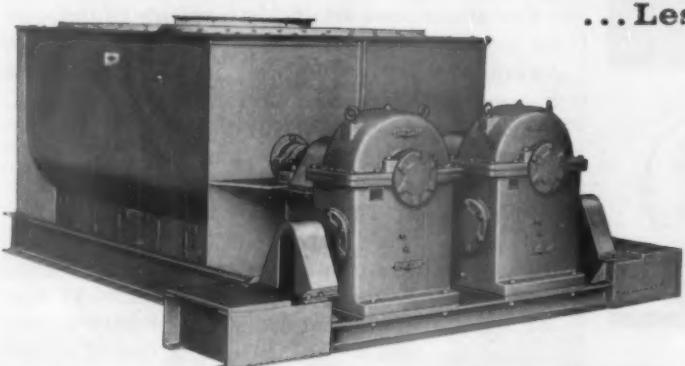
In addition, bed-depth control always uses proportional band and reset control actions. This feature accommodates wide variances, while undergrate pressure controls are nearly always limited to proportional band and through a relatively limited range.

Rate action is generally included in commercial controllers. As such, it is not usable in this application, for control response to rapid momentary recorder deviations is amplified, due to large pieces of clinker, coating and other substances. However, in many cases rate action can be conveniently inverted, which selectively damps control action during such periods so that the control even more accurately follows a true average.

END

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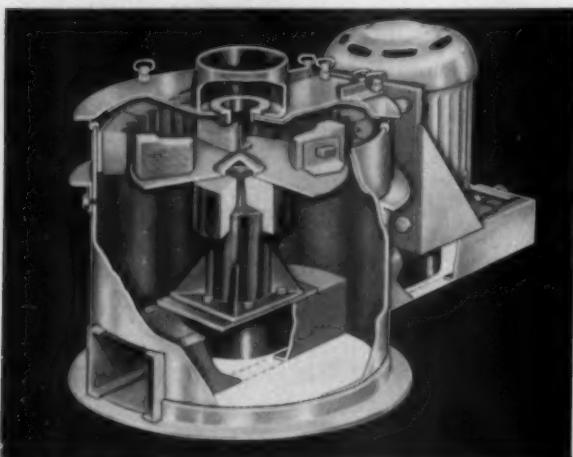
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ROCK PRODUCTS, August, 1961

Lime technology moves ahead
continued from page 114

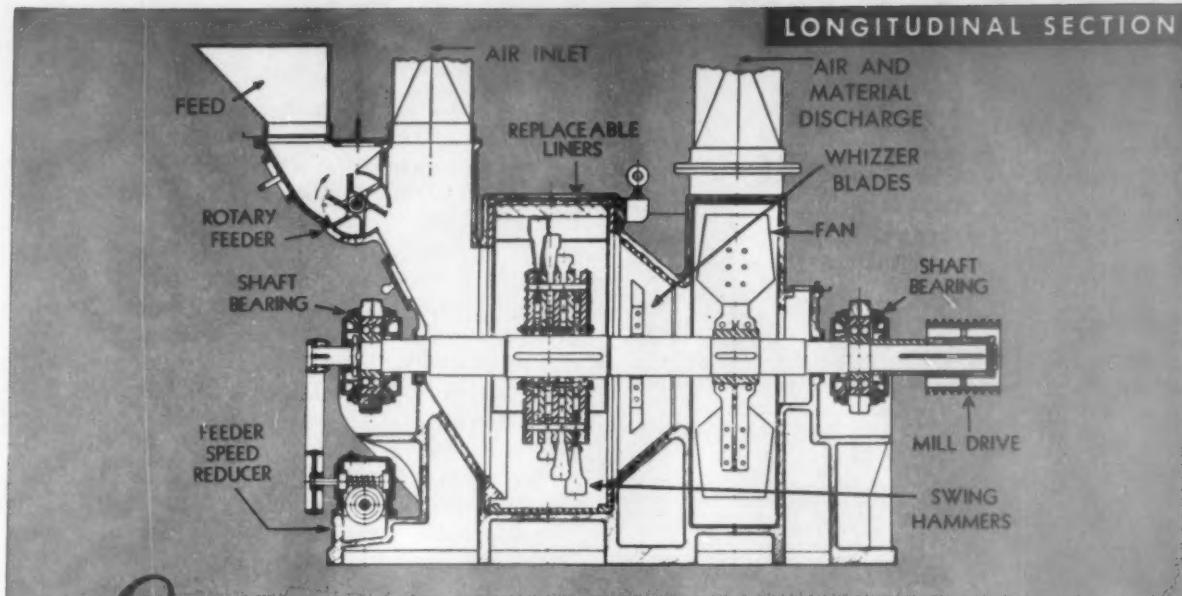
the shaft kiln gives a better sinter for less fuel than the rotary. High air preheat is possible, and the highest temperatures are readily obtained. Too, unlike the rotary, the exceedingly hot gases pervade the bed.

During the year a critical study was made of specific heat and heat of calcination data in an attempt to coordinate European and American values. A comparative study was made of European mixed-feed kilns of high thermal efficiency reputation with the better American natural gas-fired kilns of apparently lower efficiency, with the result that in evaluating on available heat basis there was little or no difference. The insidious effect of rotary kiln heat loss from the shell and attendant structures was given particular attention. Its effect is cumulative and in magnitude nearly unbelievable. There will be further reports on this most important matter.

The natural gas kiln for plants using exhaust gases for chemical uses has been further evolved. As high a percentage of CO₂ is not available as from the best of coke using mixed-feed kilns, but it is high enough—32 to 33 percent by dry volume. The kilns are fully automatic and may be of over 200-ton lime capacity. The advantage is that natural gas is a cheaper fuel and the lime is better than of a mixed-feed kiln.

One of the most satisfying moments of the year for me was the establishment of the Azbe Lime Award for the best research paper on lime. The first recipient, and a most worthy one, was J. C. Miller of the National Gypsum Co. for his paper, "The Reaction Between Calcium Oxide & Water." It is only a small way of repaying an industry which has been not only good to me, but has furnished me with never-ceasing challenge and opportunity. It has been a long trek from my arrival to this country as a penniless, uneducated 17-year old, back in 1907. And everything I have accomplished has been without benefit of formal schooling, strictly through experience and an initial yen to conquer the problem of waste heat and power, a problem which had previously been ignored.

Editor's Note: In his next article, Mr. Azbe will take you on a trip to several European kiln installations



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The Imp Mill is particularly intended for medium fine and fine grinding of softer non-metallic minerals and many manufactured products. Wide usage of the Imp Mill is made in a great many fields where pulverizing is desired.

★ VERSATILITY OF APPLICATION

Mills are built in a variety of types and sizes to produce many different capacity requirements. They have a wide degree of adjustment of product fineness, ranging from about 20 mesh to 325 mesh, depending upon material handled.

★ NEED OF CLASSIFIER

For higher finenesses or more uniform finished products than the Imp Mill would normally produce, an air classifier may be used. Either an integral Whizzer Separator or a Raymond Mechanical Air Separator could be installed according to the particular type of operation needed and the material to be processed.

★ FLASH DRYING

The basic design of the Imp Mill readily adapts itself to the simultaneous drying and pulverizing of materials. The Mill utilizes heated air or products of combustion for removing surface moisture and, in special cases, chemically combined water from materials during grinding. In all instances air is used as the conveying medium.

★ FLEXIBLE IN INSTALLATION

Each Mill System is a compact installation, engineered to fit most any plan or layout. The floor space is held to minimum requirements of Mill and Drive Motor. Piping variations permit cyclone collector, within limits, to discharge material where needed. Systems are completely enclosed from feed hopper to finish bin.

★ DUSTLESS OPERATION

The excess air is diverted to a secondary collector or, where permissible, can be exhausted to the atmosphere.



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ROCK PRODUCTS, August, 1961



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Aggregates production at dams . . . *continued from page 106*

bypassed and wasted, and drained sand was reclaimed by a locomotive crane.

The rakes stopped for a few minutes during one of my several visits to the plant. I dug out some of the sand from the bed, about at the water line but under the rakes, and tested it in a gold pan. The test showed fine gold, and I showed the results to Tom Price, general superintendent of aggregates production. He knew about its presence, and estimated that the pit-run material contained about 5¢ per ton of gold. It was not recovered, but we estimated that Hoover Dam has locked up forever about \$400,000 in gold.

Wash water for the aggregates came from the Colorado river, and contained up to 50,000 ppm. of solids in the form of silt and mud. Pit-run material was also high in silt. Since the specification on silt in the product was less than 0.1 percent, it was necessary to clarify the water in a large diameter thickener. The system reduced silt to less than 500 ppm. in the plant that used 300 gpm. Two filters were used to prepare water for the locomotive boilers.

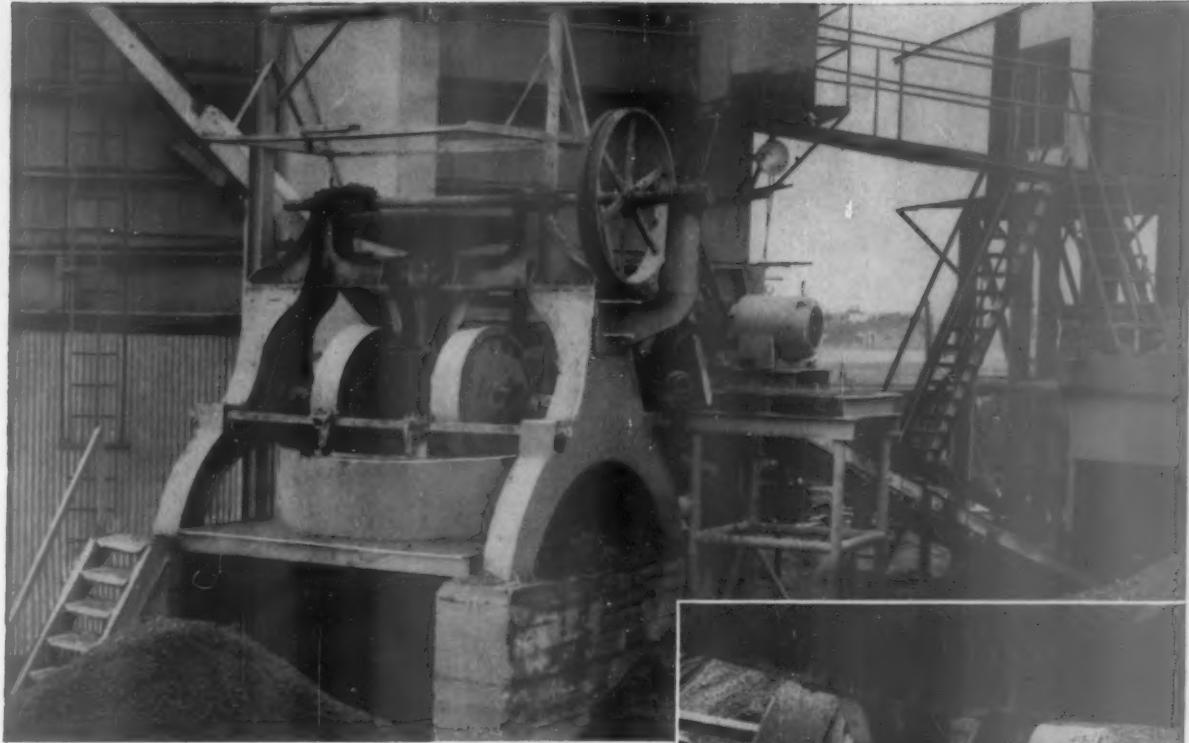
The plant was of all steel construction. Coarse aggregate and concrete sand were prepared in four steel towers. Steel was used to reduce possible high maintenance costs that were believed would be caused by excess shrinkage of wood in the dry, desert climate, if it were used. Fingers out from each tower were stacker belts that unloaded over a reclaim tunnel. Nine heavy-duty vibrating feeders were installed in the tunnel.

The temporary aggregates plant was built above the dam site. But when the dam height reached 350 ft. the gates were closed and the rising water soon covered the plant site. In planning for this eventuality, and to be sure that enough aggregates would be available to complete the job, a 7-million ton stockpile was established at an elevation high enough to escape inundation. This size of pile may still stand as a record. Material from the stockpile was given a screen rinse before it was used.

Belt conveyors were used throughout the plant; there were 23 in number, and belt width ranged from 24 to 48 in. Plant design was such that belt speed could be increased to raise plant capacity, if needed.

The late F. T. Crowe was project manager for Six Companies, Inc., builders of Hoover Dam. Mr. T. M. Price, now affiliated with Kaiser Industries, was superintendent of aggregate production.

The next article in the series will review the highlights of Grand Coulee, Shasta, and other dams in the West.



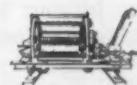
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"Our American #9 grinder has ground 35 cubic yards of Haydite per hour and is capable of higher production," comments H. R. Sublett, plant superintendent for Texas Lightweight Aggregate Company of Stafford, Texas. "Our expanded clay is very abrasive, but the American #9 requires much less maintenance than any other type of grinder we could use. The mullers have been used 5 years and are good for 2 more years. That's real service," states Mr. Sublett.

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TRUCK TALK

by Chet Cunningham

If you've had piston and cylinder liner scoring caused by lack of coolant or proper coolant flow, here's a way to prevent it. Cummins makes a device that works on a differential of the pressure of your coolant flow from the pressure side of the water pump. When the pressure drops, an electrical contact is made and a warning light comes on in the cab. It's effective at speeds that give you normal coolant flow.

Cummins says that improper coolant flow may be caused by any of the following problems:

- Insufficient or low coolant level
- Excessive air entrainment in the coolant
- Air or vapor lock of the water pump
- Clogged radiator
- Water pump impeller slipping on shaft
- Water pump belt slipping or broken
- Improperly operating thermostat
- Dirty radiator fins

Loss of coolant flow from any of these conditions results in overheating of pistons, cylinder liners and other parts of the combustion chamber and may be so rapid that the engine heat indicator gage will not show overheating until the piston or liner scoring has occurred. A slight score under these conditions may "heal over" and not indicate a serious problem until another overheated condition occurs when much more serious damage results.

A coolant flow indicator can catch this pressure drop very quickly and warn the alert driver of the problem before any overheating takes place.

If you have ever considered using L-P gas on your trucks, here are some more details. L-P gas will completely eliminate sludge in your oil, extend oil life by 500 percent, eliminate carbon in your oil, prevent oil dilution, prevent cylinder wash and provide even distribution of fuel to all cylinders.

Why aren't more L-P fuelled trucks used? Original cost runs about \$250 to convert to L-P gas. This includes fuel tank, lines, carburetor and labor. Other drawbacks: You lose about 10 percent in miles per gallon, but this is offset by slightly lower fuel cost.

There is no law preventing use of L-P gas vehicles on streets, roads or highways. However, some cities do restrict the fuelling of L-P gas tanks to areas outside major business districts.

Propane gas is as safe as the gas that cooks your meals. It is under the same pressure in the tank as the gas is in your home. There is virtually no chance for an explosion. The pressurized tank can stand 1,000 psi.—hundreds of times the normal pressure.

How about a wreck? The propane tank is much safer than the lightweight gasoline tanks on most trucks. Safety men say that when used in trucks, propane is much safer than gasoline.

Could you save with an L-P gas truck? Balance out the cost of conversion against savings on engine overhaul and repair, savings on oil, on engine life and on saved mechanic's time. L-P equipment can also be transferred from one rig to another, this cuts down on your expense.

Talk the L-P gas idea over with your local propane or butane distributor. He will have exact cost factors to show you and he can give you a complete cost breakdown. Then it's up to you to decide if L-P gas will save you money.

No matter how good the tires on your trucks are to start with, how long they last is mainly up to the driver. Here are some driving rules to help extend the life of your tires:

1. Avoid speeding over rough roads, chuck holes or roads with loose material on them
2. Do not drive over curbs by making sharp turns into a driveway or by backing over curbs
3. Avoid riding the edge of the pavement
4. Anticipate stops, avoid sudden and improper use of brakes
5. Start slowly and do not spin wheels
6. Drive at moderate speeds, especially with full loads
7. Avoid improper load distribution
8. Check for soft and flat tires frequently
9. Report misaligned wheels or other abnormal conditions noted while driving
10. With diesels, shift gears at proper RPM's only

END

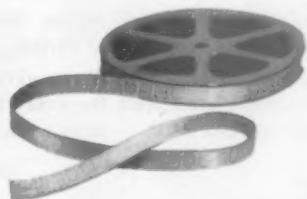
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KW-DART TRUCK CO.

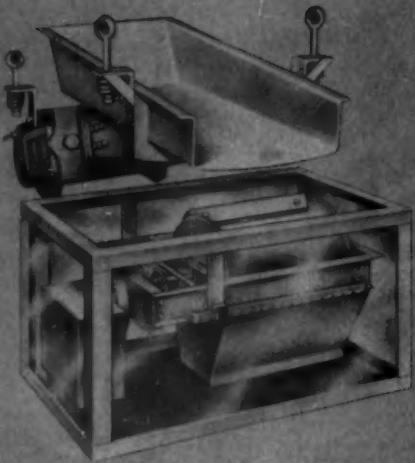
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Their simple design and accurate, dependable weigh control of feed flow increase the capacity and efficiency of end products.

The applications for Syntron "Weigh Wheel" gravimetric Feeders in industry are wide and varied.

Syntron "Weigh Wheel" gravimetric Feeders are available with maximum capacities for every application from 500 pounds to 300 tons per hour.

Let Syntron solve your weigh feeding problems.
Write for free informative literature today.

SYNTRON

Enter 1084 on Reader Card

128

ROCK PRODUCTS, August, 1961

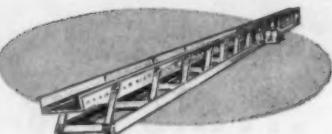
*Other
SYNTRON
equipment
of proven
dependable
quality*



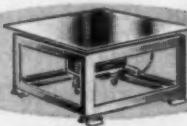
Car Shakers



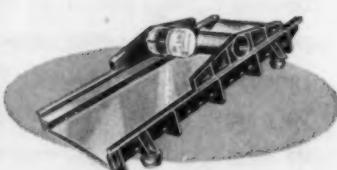
Test Sieve Shakers



Mechanical Vibrating Conveyors



Packer & Jolters



Vibrating Screens

SYNTRON COMPANY

450 Lexington Avenue • Homer City, Pa.

READER-SERVICE CARD

RP-8-61

ROCK PRODUCTS
79 W. Monroe St.

AUGUST, 1961
Chicago 3, Illinois

Cannot be serviced after
October 1, 1961 postmark.

Please print or type

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Company (In Full) _____

Company Address _____ City _____ Zone _____ State _____

Send information on items identified by key numbers beside or below items of interest to you.
List your choices in numerical order. Limit 10 per card.

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No Postage Stamp Necessary If Mailed in the United States

FIRST CLASS
PERMIT NO. 1417
CHICAGO, ILL.

- POSTAGE WILL BE PAID BY -

ROCK PRODUCTS

79 WEST MONROE ST.

CHICAGO 3, ILL.



MONEY-MAKING IDEAS FOR YOU --- FREE

HOW TO USE THIS SERVICE

- 1. Advertised Products**
- 2. New Machinery**
- 3. New Literature**

There is a wealth of valuable information in the manufacturers' booklets offered in this issue. For your convenience, each advertisement, each new machinery and new literature item has been given a key number. Simply fill in the proper key number in the appropriate space on the card above and send it to us. We'll do the rest.



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ROCK PRODUCTS
79 W. Monroe St.AUGUST, 1961
Chicago 3, IllinoisCannot be serviced after
October 1, 1961 postmark.

Please print or type

Name _____ Position _____

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Company Address _____ City _____ Zone _____ State _____

Send information on items identified by key numbers beside or below items of interest to you.
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IF NO KEY NUMBER, USE COMPANY NAME

**MONEY-MAKING IDEAS
FOR YOU --- FREE****HOW TO USE THIS SERVICE**

- 1. Advertised Products**
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There is a wealth of valuable information in the manufacturers' booklets offered in this issue. For your convenience, each advertisement, each new machinery and new literature item has been given a key number. Simply fill in the proper key number in the appropriate space on the card above and send it to us. We'll do the rest.

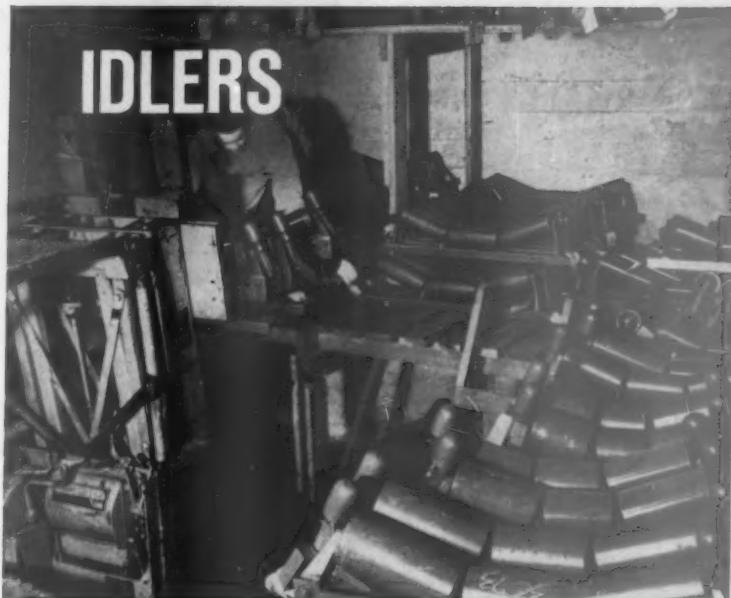


**REPLACE
WITH**
**THE BROAD
H-R LINE**

*fast delivery
technical
service
local stock*

CONVEYOR BELTS

IDLERS



There is an H-R Distributor in your area...

He is part of a stock-carrying distributor network stretching from Coast-to-Coast, backed by Hewitt-Robins warehouses and sales offices. At his fingertips is one of the widest lines of conveyor belt and idlers available in industry. At his command is technical information that could

come only from a company that makes *both* components. Hewitt-Robins stands alone as a manufacturer of conveyor machinery and conveyor belting. This fact also assures you of highest quality and single-source responsibility. Hewitt-Robins, Stamford, Connecticut.

*Write for bulletins
8-19 (Belt)
8-19 (Idlers)*



HEWITT-ROBINS

Conveyor Machinery and Belting • Power Transmission
Hose • Vibrating Equipment • Engineering Services

Enter 1082 on Reader Card

ROCK PRODUCTS, August, 1961



NEW 7-FLEX®

makes important savings
on most wire-rope applications



All-new Macwhyte 7-strand rope is flexible as 8-strand—rugged as 6 x 19—fatigue-resistant like 6 x 37. You'll get longer rope life, lower costs. Get Bulletin 60100-R.

MACWHYTE Wire Rope COMPANY

2900 Fourteenth Avenue, Kenosha, Wis.
WIRE ROPE MANUFACTURING SPECIALISTS SINCE 1886

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FOR DEPENDABILITY
PLUS ECONOMY
REPLACE WITH

INDIAN BRAND

Get the most out of your present equipment. When you need replacements, remember we started in 1913 to build our reputation in the Manganese Steel field for dependability plus economy.

Insist on
INDIAN BRAND
MANGANESE STEEL



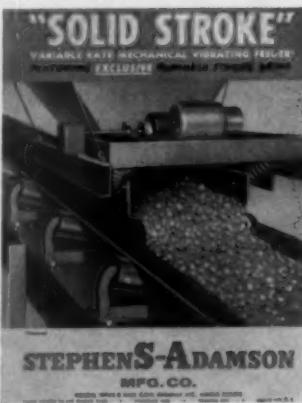
Shovel Dippers • Dipper Teeth
Shovel Treads
Crusher Jaw Plates
Mantles • Concaves
Bowl Liners • Roll Shells
Pulverizer Hammers
Grate Bars • Breaker Plates
Ball Mill Liners • Screen Plates
Misc. Manganese Steel Castings

THE FROG, SWITCH AND
MANUFACTURING COMPANY
Carlisle, Pennsylvania • Established 1881

Enter 1051 on Reader Card

NEW LITERATURE

For free information on these items, simply fill out and mail postage-paid Reader Service Card found elsewhere in this issue



Vibrating feeder

Stephens-Adamson Mfg. Co. has made available a bulletin that describes its new variable rate mechanical vibrating feeder. Included in the illustrated bulletin are a listing of the operating and engineering features of the unit. Feeder dimensions, size selection and installation instructions are also given.

Enter 500 on Reader Card

Rock tongs

M. P. McCaffrey, Inc., has assembled complete information on its line of rock tongs in a new folder. A series of on-the-job photographs demonstrate full advantages of the rock tongs in field operation. Also included is a detailed, easy-to-read specification chart.

Enter 501 on Reader Card

Cement slurry control

Bailey Meter Co. has released three process application sheets describing cement slurry level measurement, kiln speed—slurry flow ratio control and auto-

matic cement slurry density (moisture) control. One bulletin diagrams the manner in which cement slurry level is measured by means of a bubbler system. Indicating, recording and transmitting instruments for this system are also discussed. The second bulletin describes how a proper feed rate to the kiln is maintained regardless of kiln speed. A diagram shows how slurry flow and kiln speed are automatically ratioed to maintain proper feed rate. Control of moisture content of the slurry in wet process cement kilns is described in the third bulletin.

Enter 502 on Reader Card

Industrial machinery

Nordberg Mfg. Co. has released "Nordberg Machinery for the World's Major Industries," a new brochure which illustrates and describes the company's products in a 24-page reference. The 3-color bulletin includes both installation and product pictures of the machinery.

Enter 503 on Reader Card

Thermocouple materials

Temptron, Inc., has made available a 10-page catalog describing the processes used to produce the company's thermocouple materials. In addition to specifications and descriptive data on the metal-sheathed, ceramic-insulated wire, the catalog also describes the company's facilities and its in-process quality control system.

Enter 504 on Reader Card

Please turn to page 135

News Reports from Operators Reveal Stamina of SECO Twin Bearing Screens

Now, you can expect and get a new kind of stout-hearted performance from 2-bearing screens.

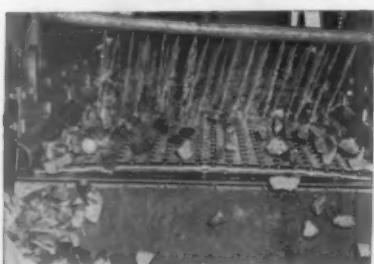
That is, if they are SECO TWIN BEARING screens. Yes, actual results, reported to us by producers themselves, give strong proof that SECO design and engineering superiority really pay off . . . day after day, year after year where it counts . . . on the job. Today, with your own profits so dependent on operational efficiency, we believe it will pay you to get the full information about SECO TWIN BEARING screens.



"Over 1,000,000 tons without a whimper from our SECO TWIN BEARING screens" reports Jules Kozat of Buffalo Crushed Stone Corporation. "We've screened eight sizes of aggregate for 1½ years without a minute of downtime. We are so pleased we now have seven SECO TWIN BEARING screens on the job."

"We like the action and performance of this screen." Joe Schwendt, Sup't., Amico Sand & Gravel Co., Riverside, N. Y.

"This screen is a real screener. Elmer is very happy with it, and says they will be ordering more of them in a month or so." R. P. Fulton, Southern Machinery & Supply Co., Roanoke, Va.



"This sieve analysis is a real endorsement for SECO TWIN BEARING screens." K. K. Kagarise, General Sup't., The Standard Slag Co., Youngstown, Ohio.

"Our SECO TWIN BEARING screens are doing a real good job of screening. Our only replacement has been screen cloth." Paul Padgett, Purchasing Agent, Thompson, Weinman & Company, Sylacauga, Alabama.

"I never believed a 2-bearing screen could perform like this." We're averaging 120 TPH in three sizes of gravel plus concrete sand . . . with no trouble at all on our 3 x 10 Triple Deck model." Eric A. Krehbiel, President, Clarence Sand and Gravel Corp., Clarence, New York.

SEND FOR BULLETIN TB-21

SCREEN EQUIPMENT CO., INC., BUFFALO 25, N.Y.

ROCK PRODUCTS, August, 1961

Designed for Volume Low Cost Screening

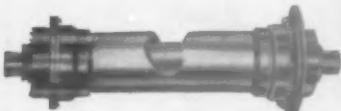
SAND • GRAVEL • CRUSHED STONE • CINDERS • SLAG and AG-LIME

Single, double, triple and half deck variations. May be suspension or base mounted.



RIGID BOX FRAME CONSTRUCTION

Eliminates body distortion thus preventing undue stress on shaft assembly.



20%-30% HEAVIER AND STRONGER SHAFT

The heart of the screen, precision built with an extra margin of safety and with extra heavy bearing, too!

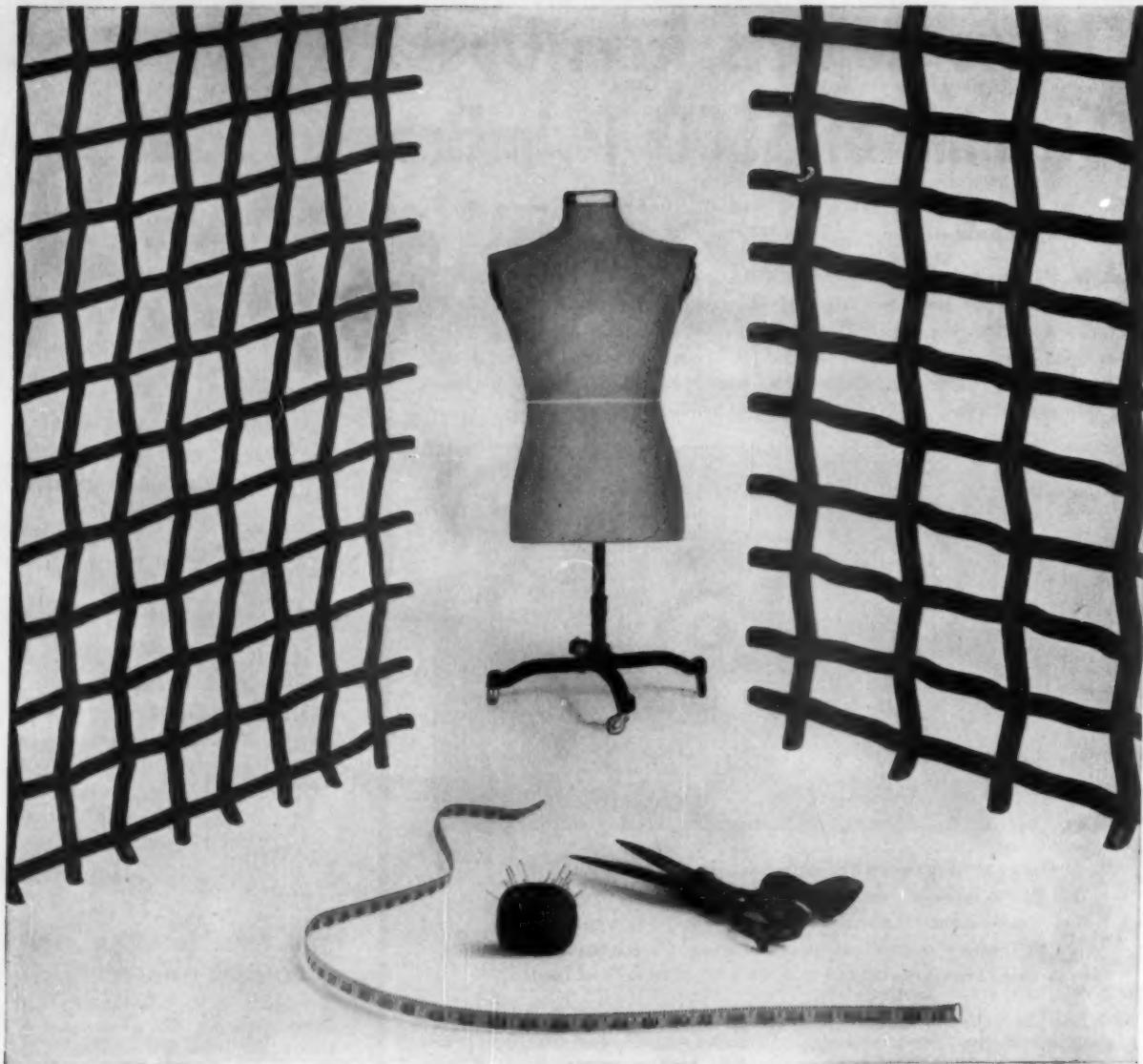
OIL BATH BEARING LUBRICATION



Provides more thorough lubrication for longer bearing life. Special flinger type seals prevent oil entering the tube assembly.



Enter 1081 on Reader Card



Tailor-made to fit your needs... CF&I Space Screens

Space screens are like suits — they not only have to be the right size, but they have to wear well, too. That's why CF&I Space Screens are your best buy.

To make sure that you get a screen that fits your operation perfectly, CF&I produces virtually every size and type of weave. If one of our standard screens won't do the job, we'll be glad to tailor-make a screen to your exact specifications.

To assure you a screen that "wears like iron," CF&I uses only the finest quality steel wire and weaves it on giant hydraulic

looms. This produces tight wire intersections so that the screens will retain their size and shape of openings under the most punishing vibration and abrasion.

The result is a screen that is more economical because it cuts your equipment downtime and lowers the cost-per-ton of material screened.

Your CF&I representative will be glad to study your operation and recommend the screen that best meets your requirements. Call him today.

8197



The Colorado Fuel and Iron Corporation
Denver • Oakland • New York
Sales offices in Key Cities

Enter 1080 on Reader Card



ERIEZ Magnetic Minute

60 seconds that will help you improve operating efficiency.



CLOGGED BINS A PROBLEM?

If troublesome slowdowns caused by sticking, arching, stubborn materials are your problem, here's good news:

Eriez Hi-Vi® electro-permanent magnetic Unit (Bin) Vibrators are your answer. They've proven superior time and again for dependable movement of stubborn masses of granular, lumpy or powdered materials in bins or hoppers.

Their concentrated vibration is directed to deliver maximum efficiency precisely where it is needed. The full Hi-Vi line offers models for use with all sizes of bins with wall thickness to $\frac{1}{2}$ " — Special models are available for hazardous, dusty locations.

All models bring you these advantages.

- Direct AC operation — no need for rectifiers.
- Lower operating and maintenance costs.
- Compact, light-weight, easy to install.
- Weather-and-dust-resistant housings at no extra cost.
- No sliding or rotating parts.
- No wear, no lubrication.

Get the Hi-Vi unit that's exactly right for your operation. Full technical data is available in our new bulletin. Write for it to:

ERIEZ MANUFACTURING CO.

202VA Magnet Dr., Erie, Pa.

Eriez of Canada Ltd., P.O. Box 5, Sta. W-Toronto, Ont.



MAGNA-THOUGHT
The manufacturer who does the most for his customers is the one who is qualified to provide application know-how as well as superior products.

Wm. H. BENSON
Supervisor Vibration Engineering

ERIEZ

A GROWTH COMPANY...
10 NEW PRODUCTS IN THE LAST 5 YEARS

Enter 1058 on Reader Card

New Literature

continued from page 132

Electrical equipment for cement industry

Westinghouse Electric Corp. discusses how improved electrical systems can make most ce-



WESTINGHOUSE EQUIPMENT FOR CEMENT PLANTS

ment plants more profitable in its new booklet. The 16-page publication, "Equipment for Cement Plants," covers services and products offered by the company to the cement industry. Illustrated with photographs and drawings, the booklet includes sections on electrical distribution apparatus, control centers, motors and drives, maintenance services and research presently being conducted within the company to provide better services.

Enter 505 on Reader Card

Cubers and hammermills

Pioneer Engr. Co., Div. Poor & Co., Inc., has issued an illustrated catalog that describes the company's line of cubers and hammermills. The section on cubers includes informative copy on base assembly main housing, feed box and grizzly, rotor assembly, shafts and bearings, adjustable baffle and discharge gratings for two cuber models. Also given are complete specifications for the units. The hammermill section lists features, flow of material and construction details for two models of heavy-duty hammermills.

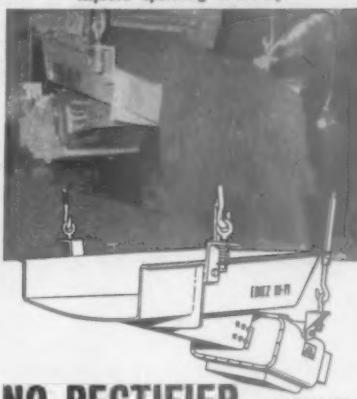
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ROCK PRODUCTS, August, 1961



ERIEZ Magnetic Minute

60 seconds that will help you improve operating efficiency.



NO RECTIFIER NEEDED WITH ERIEZ HEAVY-DUTY VIBRATORY FEEDERS

AC powered Eriez Hi-Vi vibratory feeders move large tonnages of bulk materials with accurate control . . . more efficiently and economically. Illustration shows one of a number of Eriez units available for heavy feeding applications where big capacity and accuracy are essential.

Whatever your application, there is an Eriez electro-permanent magnetic feeder that will meet your exact needs. And you get this exclusive combination of advantages: No rectifier needed . . . AC operation. Totally enclosed drive element ideal for hazardous, dusty, wet and corrosive installations. New fibre glass springs assure superior performance and control . . . longer life because spring breakage is practically eliminated.

The full line of Eriez Hi-Vi vibratory feeders includes models with feeding capacities ranging from ounces to many tons per hours.

Write for descriptive bulletin to:

ERIEZ MANUFACTURING CO.

202VA Magnet Dr., Erie, Pa.

Eriez of Canada Ltd., P.O. Box 5, Sta. W-Toronto, Ont.



MAGNA-THOUGHT

Constant research, development and refinement are the keys to new and improved products. New and improved products are the keys to a company's growth.

A. F. ISRAELSON
Chief Engineer



A GROWTH COMPANY...
10 NEW PRODUCTS IN THE LAST 5 YEARS

Enter 1059 on Reader Card

NEW PATENTS

by Oliver S. North

Recently issued patents on nonmetallic minerals*

Clays

U. S. 2,950,983—In a method for reducing the viscosity of crude kaolin, e.g. Georgia secondary kaolin, a purified clay slip is filtered and the clay solids oven dried, and the oven dried material redispersed in water and again filtered and dried. These steps are repeated until the desired viscosity is attained. (to B. W. Rowland; assigned to Georgia Kaolin Co.)

U. S. 2,951,087—To improve its properties for use as a filler in natural or synthetic rubber, or like uses, sodium bentonite is reacted with a low molecular weight unsaturated hydrocarbon. Vermiculite, kaolin, fuller's earth, hectorite and various other clays can reportedly be used in place of the Wyoming bentonite. (to E. A. Hauser; assigned to National Lead Co.)

Canadian 602,995 and 603,021—A settable "clay cement" for use in oil well drilling applications comprises optimum proportions of bentonite or California "McKittrick Light" clay and activated silica, activated alumina or a synthetic or natural aluminosilicate material. When the hole or formation is sealed, a portland cement slurry is applied over the set clay cement. (to J. U. Messenger; assigned to Magnet Cove Barium Corp.)

Canadian 603,439—An improved material for use in oil well boreholes is made by heating monovalent montmorillonite bentonite, California "McKittrick Light" clay, North Dakota "White River" clay and like clays to a temperature high enough to remove at least a portion of the interlamellar water. Muds made from this clay are readily pumpable, and when in place in the hole the mud increases in viscosity and sets with the passing of

*Copies of United States patents are available at a cost of 25 cents each (photostat copies of foreign patents at 30 cents per page) from The Commissioner of Patents, Washington 25, D.C. For convenience, coupons, each good for one copy of any patent, may be purchased from that official at the rate of \$5.00 per 20-coupon pad or \$25.00 per 100-coupon pad.

time. (to J. U. Messenger, W. R. Foster, S. A. Williams, Jr. & L. Hermes, Jr.; assigned to Magnet Cove Barium Corporation)

British 841,293—In the manufacture of water-soluble aluminum salts, kaolin or other clay is reacted with ferric sulfate in a closed vessel. (assigned to VEB Farbenfabrik Wolfen)

Vermiculite

U. S. 2,949,623—A friction belt for use in glossifying wall panels, flush doors, etc., is made by coating a flexible backing material with an adhesive, and affixing thereon either exfoliated vermiculite or expanded perlite. (to L. E. Dimond; assigned to General Plywood Corp.)

Canadian 601,798—Use of exfoliated vermiculite as the preferred carrier for a lower aliphatic halohydrocarbon soil fumigant. (to O. H. Hammer; assigned to Dow Chemical Co.)

Canadian 602,193—In a process for comminuting mica, vermiculite, lepidolite or other micaceous minerals, the mineral is heated at 800-1,600 deg. F. for at least 5 min. and then ground, using either wet or dry methods. (to R. Leblanc)

Talc

U. S. 2,927,658—In a method for reducing the bulk of a mass of powder, e.g. powdered talc, the powder is admitted into the bottom of a silo, and then a zone of reduced pressure is created above the powder which thereupon settles. (to W. L. Slater, Jr.; assigned to Texaco, Inc.)

U. S. 2,930,751—A medium for the filtration of gasoline, kerosene or crude petroleum consists of a kerosene-agglomerated mixture of bento-

nite and trisodium phosphate. (to F. J. Holland)

British 826,328—Use of lightly calcined attapulgite in an intestinal absorbent composition. (to M. Barr and A. L. Monaco; assigned to American Home Products Corp.)

British 826,706—Use of hectorite as a stabilizer in the treatment of beer with sulfur dioxide. (assigned to American Tansul Co.)

British 826,740—Use of ball clay as the binder in a porous material formed principally of rice hull ash particles. (to J. D. Jones; assigned to Ontario Research Foundation)

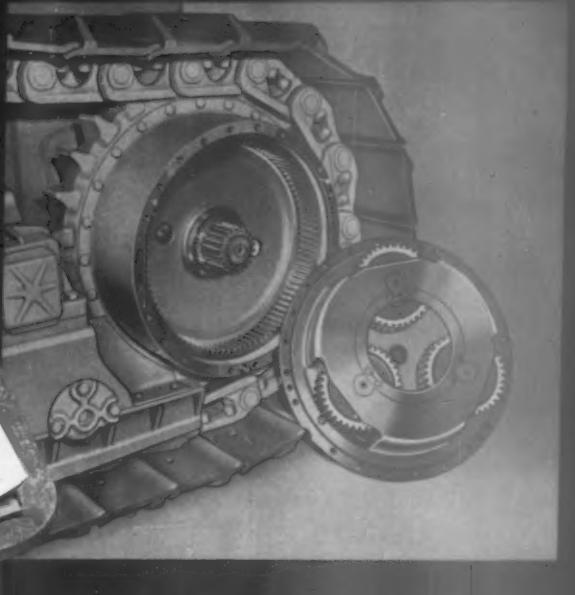
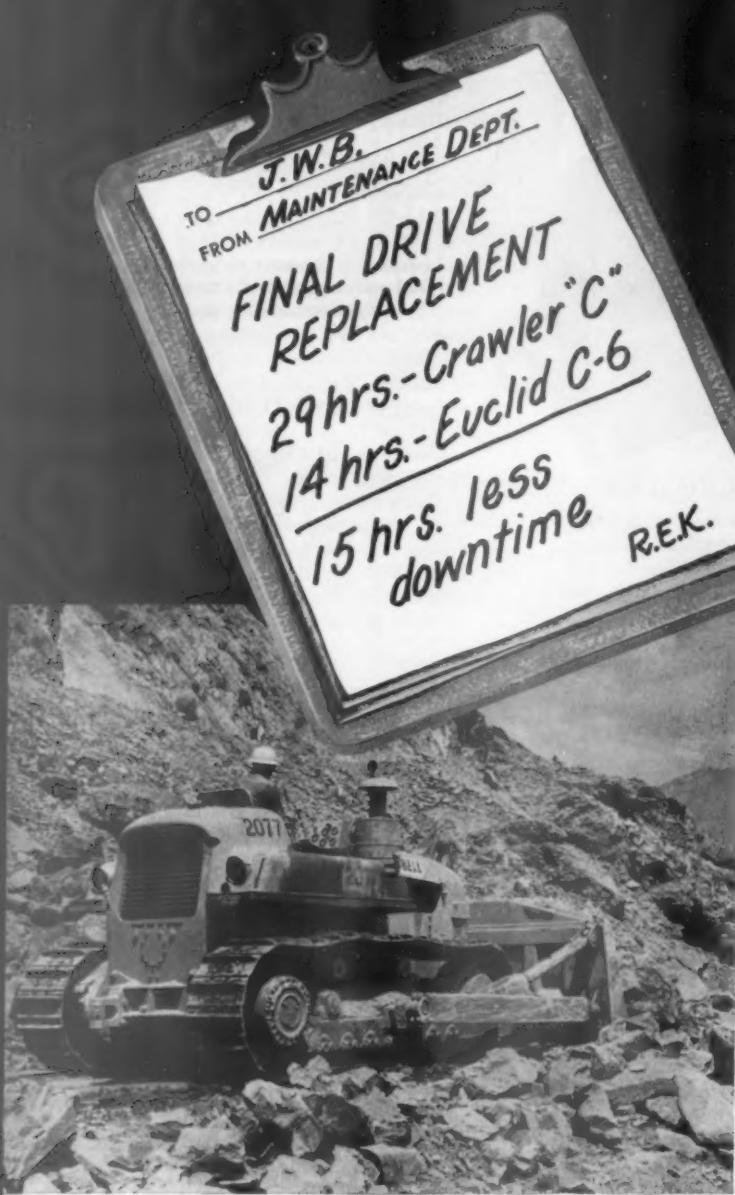
Perlite

Canadian 600,767—In the production of an improved filter aid or filler product, crushed raw or acid-treated perlite ore is mixed with a white refractory oxide and then expanded by firing at 1500-2100 deg. F. The expanded particles possess improved light reflecting properties. (to H. Houston; assigned to International Minerals & Chemical Corp.)

Australian 225,418—In the manufacture of plasterboard, a water-soaked sheet of paper or thin cardboard is placed flat, coated with an adhesive and then covered with an aqueous layer of gypsum plaster. Expanded perlite or organic fibers are then worked into the plaster. (to J. V. Scales)

Australian 225,516—In a process for producing a high-quality filter aid product from minus 30-mesh crude perlite ore, the finely divided ore is soaked in dilute sulfuric acid, hydrochloric acid or other mineral acid prior to furnacing. This treated ore expands at a greater rate at a given temperature. (to H. Houston; assigned to International Minerals & Chemical Corporation)

Please turn to page 138



***...a saving of 15 hours labor and
productive time with the C-6
and no special tools required!***

C-6	Crawler "C"
Planetary Gears	Gears and Bearings . . . 16 hours
Inside pinion and drive gear reduction . . .	Top pinion from steering clutch with bearing and shaft 13 hours
11 hours	
Total 14 hours	Total 29 hours

Times shown are for removal and replacement of final drive with all components in place.

With a 15 hour saving for final drive replacement the "Euc" C-6 gives you 15 hours more productive time on the job! Easy accessibility that's designed into the C-6 and Euclid's time-tested planetary drive save hours of repair labor . . . that means less downtime and more production. Compare these savings in terms of lower costs . . . add the

extra hours available for work on the job . . . then you'll see what just this one advantage can do in cutting operating cost.

▲ The Euclid dealer in your area would like to prove that the C-6 is the lowest cost tractor in the 200 h.p. class . . . and the most versatile by far. He's sure of it, and wants you to know the facts, too!



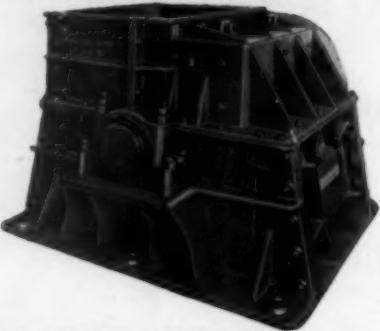
EUCLID

DIVISION OF GENERAL MOTORS, HUDSON, OHIO

Plants at Cleveland and Hudson, Ohio and Lanarkshire, Scotland

**GRUENDLER'S 76th YEAR—MANUFACTURERS
OF QUALITY BUILT REDUCTION MACHINERY**

For low cost, high
tonnage reduction of
quarry run limestone
select the dependable
GRUENDLER "ROCTRON"



SINGLE ROTOR PRIMARY IMPACT CRUSHER



Ratios of up to 30 to 1 obtained depending on feed size. Tremendous in strength and powerful. Precision built for a lifetime of economical service. Wide range of sizes. Tramp metal catchers and automatically controlled feeders are optional.

Write stating the kind of rock and your tonnage requirements.

Illustrated Bulletin also sent to you without obligation.

GRUENDLER
GRUENDLER CRUSHER & PULVERIZER CO.

DEPT. R. P. 861

2915 N. Market St.

St. Louis 6, Mo.

Enter 1060 on Reader Card

THE COST OF PRODUCTION PER YARD IS WHAT COUNTS

NEW Type D-T
Heavy-Duty
"TELLTALE"
Centrifugal
Sand and Gravel
PUMP



It's the amount of material passing through a pump that wears out parts. Figure your production cost per yard per hour and you will find "Telltale" the most economical as well as the most productive of pumps.

AS LOW IN DOWNTIME AS IT IS HIGH IN PRODUCTION

"Telltale" is the only pump that warns when it's time to reline. Air sucked through periphery ports causes pump to lose its prime. Pumping stops. Water leaking through the ports signals that the shell liner and the surrounding belt of packing have worn through.

Available with either tough semi-steel or best-in-the-long-run Ni-Hard wearing parts in 4", 6", 8", 6 x 8" suction and 8 x 10" suction. Now available also in either alloy, 45 and 90° extra-heavy long-radius flanged elbows. Write for Type D-T Heavy-Duty folder and prices.

PEKOR IRON WORKS, INC.

ESTABLISHED 1892

LOCK DRAWER 909

FAIRFAX 2-4020

COLUMBUS, GEORGIA

Enter 1061 on Reader Card

138

ROCK PRODUCTS, August, 1961

New Patents *continued from page 136*

Spodumene

Canadian 601,441—In the production of water-soluble lithium salts, **spodumene** is treated with gaseous catalyzed sulfur trioxide at a temperature above the decomposition temperature of the ore. The roasted material is then cooled and leached with water or sulfuric acid. (to J. U. MacEwan; assigned to Quebec Dept. of Mines)

Canadian 601,498—In the recovery of lithium sulfate, alpha- or beta-**spodumene** is agitated during treatment with a gaseous mixture of sulfur dioxide, oxygen and sulfur trioxide to form lithium sulfate and a water-insoluble residue. (to J. U. MacEwan; assigned to Quebec Dept. of Mines)

Stone, dimension

U. S. 2,951,474—In a wire saw apparatus for cutting **dimension stone**, the mounting of the wire saw wheel on the shaft is improved so as to permit the use of friction bearings which will allow smooth and uniform operation of the wheel. (to H. E. Wayland; assigned to Ty-Saman Machine Co.)

U. S. 2,951,475—In an improved method for sawing **dimension stone**, especially of **marble** or **limestone**, the sawing operation is carried out with the longitudinal direction of the saw-blades in a vertical position, thus enabling use of shorter and more manageable blades for sawing long slabs. (to P. G. Leo; assigned to Hyresgasternas Sparkasse-och Byggnadsforeningars Rikforsbund upa & Ivan Fredrick Lindquist)

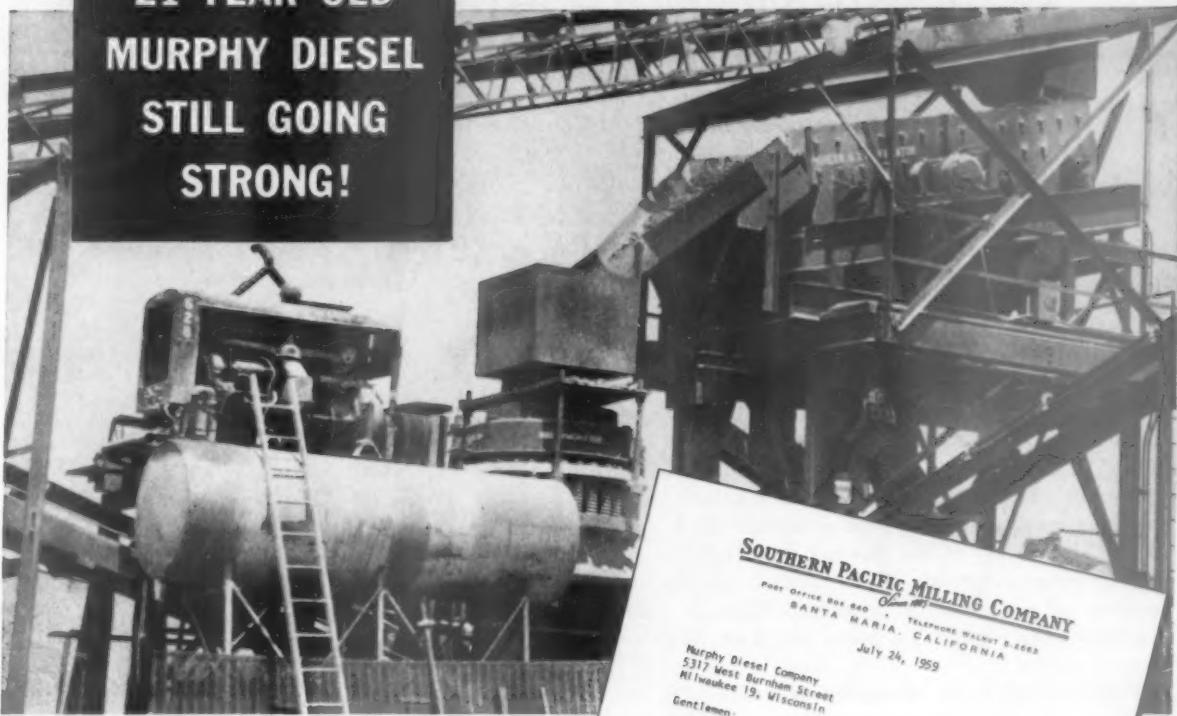
Pumice

U. S. 2,956,891—In the production of a finely porous powder suitable for insulation uses, a volcanic glass such as **pumice**, **obsidian**, of the Idaho material known as **idolite** is ground and mixed with 1-10 percent alumina, the mixture fired to 1,400-2,000 deg. F., and the resulting foamed product annealed. (to A. E. Booth & R. L. Hess; assigned to Armstrong Cork Co.)

Canadian 607,514—In the manufacture of an hydraulic cement, 5-73.7 percent quick **lime** is mixed with 26.3-95 percent **pumicite**, fly ash or other siliceous material, and the mixture attrition ground to optimum fineness. (to C. J. Schifferle; assigned to Joseph J. Coney.)

END

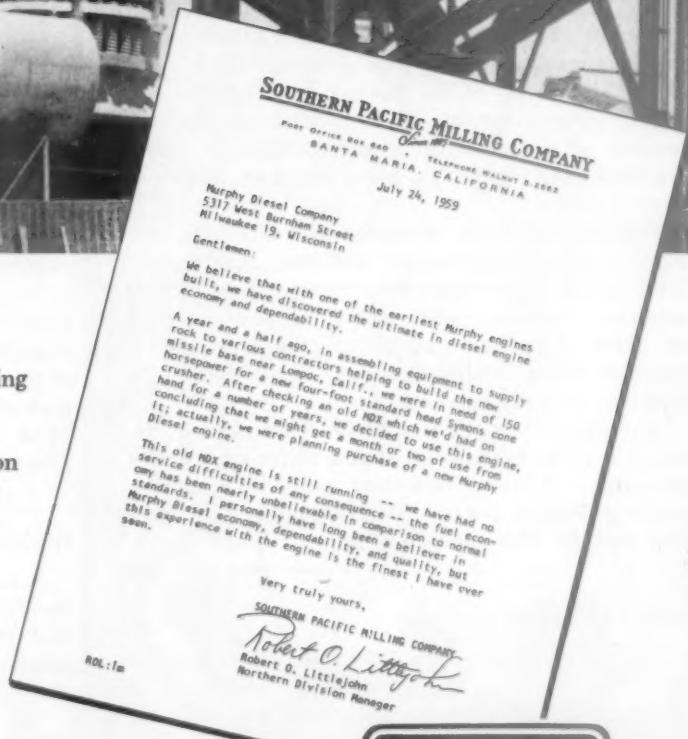
**21 YEAR OLD
MURPHY DIESEL
STILL GOING
STRONG!**



**Proof that Murphy Diesel
saves you money**

This early model Murphy is still earning its way! According to the owner, it is operating efficiently with fuel economy that is "nearly unbelievable in comparison to normal standards." The experience of Southern Pacific Milling Company with this 21-year-old Murphy is the best evidence that operators who want "the ultimate in Diesel engine economy and dependability" are wise to choose Murphy.

Twenty-one years of improvement in diesel engine design and construction make today's Murphy Diesel first choice for always-dependable, low-cost operation.



**MURPHY
DIESEL**

**HEAVY-DUTY POWER
FOR CONSTRUCTION**

Murphy Diesel engines and power units are available in sizes from 105 to 420 H.P. with engine speeds of 1200 and 1400 rpm. "Packaged" generating units are available with capacities ranging from 70 to 227 K.W.

Enter 1071 on Reader Card

MURPHY DIESEL COMPANY
5315 W. Burnham St., Milwaukee, Wisconsin

SALES . . . PARTS . . . SERVICE

Throughout the Nation

ROCK PRODUCTS, August, 1961

NEW MACHINERY

For free information on these ideas, simply fill out and mail postage-paid Reader Service Card found elsewhere in this issue

Flowmeter for granular solids

The total flow of granular materials can now be accurately measured and recorded with a new flowmeter. Virtually any material in the rock products industry that can be passed through a circular chute or spout may be measured with the new unit.

Sensing element in the device is a helical vane which is inserted in the pipe or spout. As it converts the velocity of the flowing material into rotary motion, a flexible shaft turns a mechanical counter or an electrical element. This, in turn, transmits the signal to a panel board or other remote location.

Particle size to be measured is not critical but bulk density must remain uniform. Aggregates 3 x 0 in. and 1/4 x 0 have been measured with high accuracy. Accuracy when calculated is about plus or minus 3 percent and about plus or minus 1 percent when weight-checked. Repeatability is possible within 1 percent.

Minimum spout size is 12 in. diam. and maximum is 40 in. Several types and styles are offered to meet a range of operating conditions and recording requirements. (Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10, Ohio)

Enter 100 on Reader Card

Giant bulldozer

Latest addition to the line of Paydozers is the D-500, a 50-ton, 600-hp. machine claimed to be the largest of its kind. This rubber-tired pusher dozer has four-wheel-drive and hydraulic steering to give it a high degree of maneuverability. Power transfer differentials on both axles provide exceptional traction. Any wheel now automatically receives up to 38 percent more torque when it is able to exert more tractive effort.

The D-500 is equipped with 4-wheel air-controlled brakes. It has a 160-in. wide blade which extends about 10 in. on each side of the wheel path. The six-way blade control permits lifting and lowering, side-to-side tilt and back-to-front change in pitch. Stability of the machine under all working conditions is assured with a dry ballast material in the four tires. This material is



about 100 percent heavier than conventional liquid solutions.

Standard equipment includes a three-stage, single-phase transmission with speed ranges up to 15 mph. either forward or reverse. An automatic lubrication system assures that some 27 vital points are lubricated during each half-hour of operation. The fuel tank holds some 245 gal.—enough for a full day's operation without refilling. (The Frank G. Hough Co., 705 Seventh Ave., Libertyville, Ill.)

Enter 101 on Reader Card

High-efficiency slurry pump

A major breakthrough in pumping efficiency for handling both abrasive and corrosive slurries. The new JC slurry pump is said to approximate the efficiency of a clear water pump when handling these materials.

The new pump has standardized components which allow it to be repaired or maintained rapidly. Casings, impellers and liners are chosen for the service encountered, while a stainless steel shaft sleeve is mounted in heavy-duty thrust and radial ball bearings. The volute areas in the casing have been designed to produce maximum flow with minimum turbulence, thus eliminating hot spots and excessive wear.

Three different bearing frames, 11 models and 6 sizes are offered to give a wide range of selection for exacting head and capacity conditions. (Morris Machine Works, Baldwinsville, N. Y.)

Enter 102 on Reader Card
Please turn to page 142

LE ROI LRD-3

for powerful,

deephole rotary drilling

Here's the *big rig* . . . completely self-contained for putting down hole as large as 7 $\frac{1}{8}$ in. to 100 ft. depth!

The LRD-3 is available with either crawler or truck mounting. An enclosed cab can be furnished to provide all-weather protection for the operator while drilling. All controls are conveniently grouped for easy operation and good visibility.

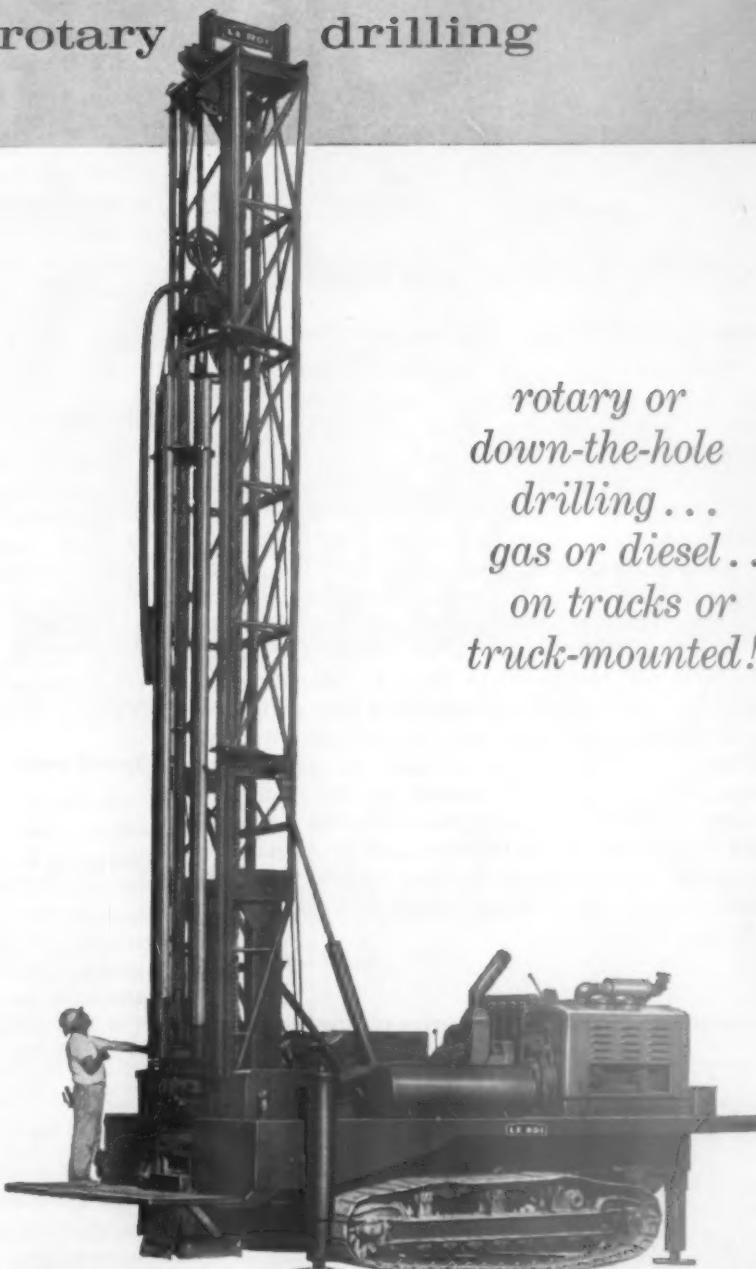
The traveling head design of the LRD-3 provides positive mechanical power without excessive torque loss under heavy pulldown, and permits easy control in making up and breaking down drill pipe. Every function of the unit is designed to speed productive drilling and keep the operator making hole. Leveling, raising the mast, and even the automatic drill pipe magazine are hydraulically controlled for speedy operation. A powerful dust collector traps cuttings and blows them well away from the unit.

An extra-sturdy 4-speed chain-hydraulic pulldown puts up to 30,000 lbs. of pressure on the bit of the LRD-3. A rugged dual-range transmission provides rotary speeds from 9 to 168 rpm in a selection of 10 forward and 2 reverse speeds.

Where needed, the rotary bit can be quickly changed for a powerful down-the-hole drill. A Le Roi 100 hp dual-manifold air compressor provides plenty of 100 psi air for punching through tough rock with the down-the-hole drill, or it can be set to deliver 625 cfm of 40 psi air for fast, efficient removal of cuttings in rotary operation.

The LRD-3 comes complete with a hydraulically operated magazine with capacity for four 20 ft. drill pipes, and can be equipped with such optional equipment as lights for night-time operation, a mounted bit grinder, air hoist, breakout tongs, water injection system, etc. Specification Sheet AT-147 describes the unit in detail, with complete spec information. Send for a copy.

*rotary or
down-the-hole
drilling . . .
gas or diesel . . .
on tracks or
truck-mounted!*



LE ROI

division of Westinghouse Air Brake Co. Sidney, Ohio

New Machinery

continued from page 140



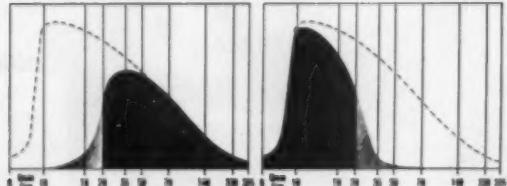
New series of portable aggregates plants

This manufacturer has combined eighteen models of portable crushing and screening plants into a new Commander series. Each model in the series incorporates many of the basic, field-proven designs from the original Commander series. In addition, variations based on this experience have been added to meet a wide variety of crushing and screening conditions. Each model may be fitted with a broad line of optional accessory equipment to solve special processing problems.

Tonnage output from the new series will range from 75 tph. to more than 700 tph., depending on material and operating conditions. As many as four finished products may be produced with a flexibility attained from as many as six screen-deck arrangements. All models use the manufacturer's own line of horizontal vibrating screens, while a choice of crusher sizes and types may be selected and combined to meet specific crushing and product specifications. (Iowa Mfg. Co., Cedar Rapids, Iowa)

Enter 103 on Reader Card

Automatic classifier for slurries of fine materials



A new hydraulic system offers exceptional efficiency to classify fine materials in the range between 30 micron and $\frac{1}{4}$ in. Its accuracy is said to meet the most exacting requirements of cement raw mixes, industrial silica, clay and other slurries of fine materials in the rock products industry. Apparently the system maintains its efficiency regardless of variations in the volume or gradation

of the raw material feed or the number of fractions desired in the finished products.

The new classification system is made up of one or more of four, custom-assembled parts—1) horizontal thickeners which concentrate the raw slurry, 2) chest wave classifiers which separate the slurry into two sharply defined fractions, 3) bi-cone thickeners to perform efficient classification at very low cutting points and 4) horizontal elutriators which separate and discard dust, clay and other deleterious materials. The figure shows the results of separating a natural sand at 20 mesh whose particle size distribution as fed to the new unit is indicated by the dashed lines. (Comco Corp., 5421 Lancaster Ave., Philadelphia 31, Pa.)

Enter 104 on Reader Card

Blasting machine for seismic exploration

A new blasting machine is said to greatly extend the range and efficiency of seismic exploration techniques in the rock products industry. The new unit measures and records the time in milliseconds from the moment of blast until the first subsurface shock waves reach the geophone. Seismic readings now may be taken to extend the range of exploration to 200 ft. deep and more. (Geophysical Specialties Co., Hopkins, Minn.)

Enter 105 on Reader Card

Speed switch

A newly developed speed switch and governor is offered that has the added advantage of two side takeoffs. This GT control provides an opportunity to attach flexible cables to drive an hourmeter, tachometer or other accessory to improve the operation of the truck engine, generator or power package. Since very little torque is needed to drive the unit, exceptionally long life may be expected. (Synchro-Start Products, Inc., 8151 No. Ridgeway Ave., Skokie, Ill.)

Enter 106 on Reader Card

Screen for wet materials

A vibrating screen is now available that promises exceptional efficiency for screening granular solids with surface moisture far beyond that considered practical. The new screen has given a good account of itself for wet screening and for dewatering materials. Much of the screen's superior performance may be accounted for by the individual longitudinal panels which may be readily interchanged or replaced. (The McNally Pittsburg Mfg. Corp., Pittsburg, Kan.)

Enter 107 on Reader Card

Please turn to page 144



TORSION SUSPENSION

Improves tractor performance...extends tractor life

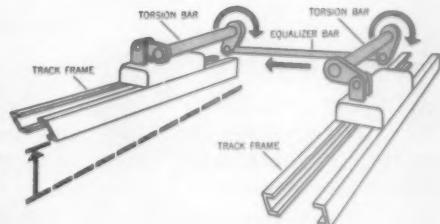
One more reason you're money ahead with CASE Crawlers

If you've operated a crawler loader (other than a Case Model 750, 800 or 1000) you know how you get "all shook up" because there's no "give" in the tracks. Dozers and drawbar tractors with springs like a "Model T" aren't much better! Stands to reason that those jolting, spine-cracking shocks you feel are transmitted to the engine, transmission and other components — *increasing wear and decreasing service life.*

You'll find a big difference in the Case 750, 800 and 1000 Crawlers with Torsion Suspension. This unique system literally "iron's out" the bumps by permitting both tracks to oscillate freely. It also gives you these additional benefits not found on any other tractor:

- Increases traction by maintaining maximum ground contact through exclusive cross-linkage.
- Maintains more effective steering control. Equalization of track loads prevents "yawing" and slipping.
- Makes it easier to maintain smooth, level cuts with blade or bucket, because tractor remains level on uneven footing.
- Provides higher ground clearance.
- Prolongs machine life, eliminates downtime by absorbing shock loads, eliminating twisting strains.

But why not ask your Case Industrial Dealer for a free job-demonstration and find out for yourself? Or for more information, write J. I. Case Co., Dept. H1471 Racine, Wis.



How Torsion Suspension Works

When one track encounters an obstacle, shock is absorbed by twisting action of solid steel torsion bar. In addition, as front of track raises, the torsion bar rotates. This rotating action is transmitted by equalizer bar to opposite torsion bar, causing it to also rotate. This forces front of track on that side downward, equalizing load distribution and increasing traction.

CT-P-575

CASE®

J. I. CASE CO., RACINE, WIS.

New Machinery

continued from page 142



New shovel dragline

A compact new 1-cu. yd. shovel has exceptional capacity for its relatively small size. In addition, the Model 271-C is readily converted to a dragline, clamshell or drop-ball.

New features of the unit include a compact swing circle gear assembly whose upper works are mounted on a double row of steel balls running in hardened races. Swing clutches are said to last longer with a unique cooling system that dissipates heat more rapidly. Other features include a one-piece main machinery case, automatic traction brakes, straight line engine mounting and a full-vision cab. (Unit Crane & Shovel Corp., Milwaukee, Wis.)

Enter 108 on Reader Card

Explosive primer

This manufacturer's explosive primers contain an extremely dense explosive, cast penolite. While more powerful than any type of nitroglycerine and impervious to water, it cannot leak under unfavorable storage conditions and will not freeze. The new primer is supplied for priming cartridges of non-cap-sensitive explosives and for nitrocarbonitrates. (Trojan Powder Co., 17 No. 7th St., Allentown, Pa.)

Enter 109 on Reader Card

Dry material flowmeter

The flow of almost any dry material in the rock products industry may now be weighed with a compact, motorless flowmeter. The new unit has only one moving part—an air bearing with no metal-to-metal contact. Heart of the system is a piezomagnetic transducer which converts flow pressure to electric current. This in turn, actuates a meter or recording device.

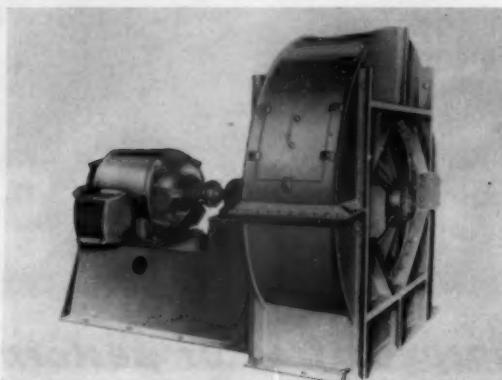
The IPI Dry-Flow meter is easily installed in existing piping or spouts without major altera-

tions. Seven models are offered for spouts ranging from 2 in. to 14 in. diam. The largest unit has overall dimensions of 3 ft. high, 2 ft. deep and 2 3/4 ft. wide. It can measure up to 3,500 lb. a min. within an accuracy of plus or minus 1 percent. (Industrial Powertronix Inc., 621 S. W. Morrison St., Portland 5, Ore.)

Enter 110 on Reader Card

Industrial fan

A new series of industrial fans incorporates a number of features unusual in heavy duty packaged fans. The Series 8500 fans feature the use of airfoil blading for quiet operation, integral



bearings, direct connection to the motor and welded steel housings that prevent vibration.

Ten sizes of Class III fans range from 30 to 80 in. in diam. and 14 Class IV fans range from 30 to 109 in. in diam. Capacities offered range from 15,000 to 450,000 cfm. at temperatures between -20 to 800 deg. F. (Sturtevant Div., Westinghouse Electric Corp., Hyde Park, Mass.)

Enter 111 on Reader Card

Lightweight sound meter

For rock products producers who are greatly concerned about an excessive amount of noise in their plants, this new sound meter will prove to be a useful tool. The new Model 450 soundmeter can be held in the palm of one hand. It weighs only two lb. and is operated by an ordinary 22 1/2-v. dry cell.

This completely transistorized meter has a range that covers most sounds generated by the machinery in a rock products producer's plant. It can measure noise levels indoors or out with equal efficiency. (H. H. Scott Inc., Instruments Div., 111 Powdermill Rd., Maynard, Mass.)

Enter 112 on Reader Card

Please turn to page 146



How two variables* make a constant winner



The 40-R drills 6½ to 9-in. holes with electric or diesel-electric power. For bigger jobs, the all-electric 50-R drills 9½ to 12½-in. holes.



The Bucyrus-Erie 40-R has been constantly setting new footage records. Here are two important reasons:

***VARIABLE DRILLING SPEED** — Ward Leonard variable voltage control lets you choose the correct rotary speed for a given formation and adapts instantly to changes without stopping the drilling operation.



VARIABLE PULLDOWN PRESSURE — Hydraulic down pressure works in any desired combination with rotary speed. Result: Record-breaking, bit-saving production under all conditions.

Let your Bucyrus-Erie sales representative tell you more about the tough, fast-working 40-R, or write Bucyrus-Erie Company, Drill Division, South Milwaukee, Wisconsin.

SPEED SENSITIVE SWITCHES



1 to 6 ELEMENT

OVERSPEED

One S.P.D.T. switch to trip at speeds between 350 and 6,000 RPM.

OVER AND UNDERSPEEDS

Two S.P.D.T. switches to trip at two different speeds between 300 and 6,000 RPM.

UNDERSPEED

One S.P.D.T. switch to trip at speeds as low as 250 RPM. Maximum operating speed 5,000 RPM.

OVER INTERMEDIATE AND UNDERSPEED

Six S.P.D.T. switches to trip at six different speeds between 300 and 6,000 RPM.

EXPLOSION PROOF AVAILABLE

The switches listed above are available with explosion proof containers that meet all of the specifications of Class I, Group D, explosion proof equipment.

*For further information ask for
Bulletin 604*

SYNCHRO-START PRODUCTS, INC.
8151 N. RIDGEWAY AVENUE, SKOKIE, ILLINOIS

Enter 1063 on Reader Card

Slurries...handled at lower cost

The new WILFLEY MODEL K Centrifugal Sand Pump embodies important mechanical improvements especially adapted to the handling of cement slurry and results in stepped-up production and substantial power savings. Individual engineering. Write for details.

**A. E. WILFLEY
and SONS, Inc.
Denver, Colo., U.S.A.**

Buy WILFLEY
for Cost-Saving
Performance



WILFLEY
centrifugal PUMPS

Enter 1064 on Reader Card

DON'T MISS THE
"OPERATIONS IMPROVEMENT"
ISSUE OF
ROCK
PRODUCTS
COMING IN SEPTEMBER!

It has a special significance
for all Rock Products
Producers

New Machinery *continued from page 144*

Classifier for fine dry materials

Mesh-size dry fines may be accurately sized with a new "gravitational-inertial" classifier. The new unit has no internal moving parts, and once the air velocities are set for a given separation point, no further adjustments are needed. First installation of the new classifier is to remove the minus 100-mesh fines from a feed of minus 16-mesh high-calcium limestone.

In operation, the raw feed is introduced into a downward-moving primary air stream. The velocity of this primary air determines the particle size which will be expected to make the turn as the material reaches a baffle plate. Fines are carried into an eddy current by a secondary air stream and the entrained material is drawn to a cyclone. Oversize drops through the classifier. Since the air stream goes to the collector cyclone at a constant rate, the velocities of the primary and secondary air must be balanced to achieve the exact split of material required. (Buell Engr. Co. Inc., 123 William St., New York, N.Y.)

Enter 113 on Reader Card

Cement-loading chute

A completely new telescoping chute is offered for loading portland cement into bulk trucks or covered gondolas. When retracted, the new chute is about 9 ft. long but it can extend to about 20 ft.

The new design has several features which improve its reliability and efficiency, including a special rubber seat at the discharge end to protect both the spout and the receiver from damage. In addition, the heavy duty loading head pivots in a special socket arrangement that gives unusual loading flexibility. (Finco Inc., 525 Rathbone Ave., Aurora, Ill.)

Enter 114 on Reader Card

Positive action vibrating feeder

A newly developed vibrating feeder is said to be the only one on the market to offer the advantages of a solid drive connecting rod and a full range of variable speed. These features assure 50 to 100 percent greater capacity than other feeders of the same size while damping under load is eliminated.

The new feeder takes advantage of the 88 natural frequency principle to make efficient use of the energy in the system. With a number of successful test installations in the rock products industry, the new unit has proven itself to be a rugged, high capacity feeder. (Stephens-Adamson Mfg. Co., Ridgeway Ave., Aurora, Ill.)

Enter 115 on Reader Card

END



*Trade Mark

OPENING

Ready-mix producers . . . and all users of *sewn* multiwall bags:

Here is the fastest, cleanest multiwall bag opening—Bemi-Strip.

Bemi-Strip gives a tight seal. Yet, to open, your customer need only grab the red tab and pull. The bag opens quickly, cleanly.

No fumbling for thread ends. No cutting. No stuck closure seams. Your customers will appreciate the convenience.

Ask your Bemis man for complete information.

General Offices—408-M Pine St., St. Louis 2 • Sales Offices in Principal Cities

Enter 1070 on Reader Card

ROCK PRODUCTS, August, 1961



where packaging ideas are born

MANUFACTURERS NEWS



New president for Chicago Pneumatic

Chicago Pneumatic Tool Co. announces the election of Guy J. Coffey as chairman of the board and chief executive officer of the company. Mr. Coffey succeeds H. Arnold Jackson who will continue as a director and chairman of the executive committee. Norman Readman has been elected president to succeed Mr. Coffey. Mr. Readman was formerly managing director of all overseas operations of the company.

"Ideal Transport Story"

Link-Belt Co.'s, Chicago, Ill., motion picture about the world's longest transport belt conveyor, "Ideal Transport Story," was named the year's best sales promotion film by Industrial Photography Magazine. The film shows all phases of construction and operation of the 5½-mile

long conveyor which carries limestone and shale from the Ideal Cement Co.'s quarry at Lawrence to its plant in Ada. The first major conveyor installation supported by prestressed concrete structures, the system is made up of 7 separate belt conveyors arranged to feed consecutively one upon the other.

Newton heads new WEMCO dept.



P. H. Mulcahy, general manager of WEMCO Div., Western Machinery Co., San Francisco, Calif., has announced the appointment of Douglas E. Newton to head a newly created Aggregate-Conveyor Dept. In his new position, Mr. Newton will be responsible for sales and development of the company's aggregate preparation, beneficiation and conveying line. In addition, he will manage the operation of a special engineering group, created to design and engineer complete aggregate processing plants.

Harnischfeger in Brazil

Harnischfeger Corp., Milwaukee, Wis., has entered into a joint venture with a Brazilian company to manufacture power cranes and shovels in Sao Paulo, Brazil. Raymond F. Herr, general manager of Harnischfeger's International Div., announced that Equipamentos Industriais Villares, S.A., is operating under an agreement with the U. S. firm to use the company's patents, designs and manufacturing processes. Villares also has a technical service agreement to manufacture the company's overhead electric cranes and hoists.

Roebling moves

The New York and Philadelphia offices of John A. Roebling's Sons Div., The Colorado Fuel & Iron Corp., are now located in a new office and warehouse at Adams Station, N.J. A full complement of office and warehouse personnel, representing wire rope and cold rolled steel products will be involved in the transfer.

From this central location, sales representatives will be serving wire rope customers in the New York area, Philadelphia area, New England states, Maryland, Virginia and the District of Columbia. The new building is a concrete and glass structure occupying 47,600 sq. ft. of warehouse space and 6,000 sq. ft. of office space. It is equipped with a heavy-duty crane to handle the heavy loads encountered.

Please turn to page 150

CORHART "BALANCE" PAYS OFF HERE!

398 days between hot zone repairs

HOT zone refractories in this cement kiln "held the line" for 398 days between repairs . . . substantially more than two times longer than usual! A good portion of the credit for this outstanding run can be traced to a 15-foot panel of fusion-cast Corhart 104 refractory, located strategically at the heart of the hot zone.

The Corhart panel was installed in the kiln's most severe wear area to balance refractory life throughout the hot zone. Corhart 104 can do this because it is *not* a conventional refractory . . . it is a patented product made by Corhart's electric melting process. As a result, 104 resists spalling and chemical attack up to two or three times longer than conventional linings.

Corhart balance adds-up to longer continuous production runs, lower repair costs, and much lower refractory-cost-per-ton-of-clinker. Investigate the benefits of Corhart 104 before your next repair. Write: Corhart Refractories Company, Incorporated, 944 Commonwealth Building, Louisville 2, Kentucky.



Closeup shows thickness and coating of Corhart 104 section after 398 days in operation. This is a high-capacity rotary kiln with a Lepol pre-heater system.



CORHART REFRACTORIES COMPANY

Subsidiary of Corning Glass Works

The words "Corhart", "ZAC", and "Electrocast" are registered trade marks which indicate manufacture by Corhart Refractories Company, Incorporated.

Manufacturers News

continued from page 148

New engineered service

A new engineered service has been announced by Research-Cottrell, Inc., Bound Brook, N.J., for converting mechanical and tube rectifiers for electrical precipitators to silicon rectifiers. Payout time for the conversion can be greatly cut by the engi-

neered service. To insure the most economical operation, proper size silicon rectifiers and control circuit changes are recommended by the company after engineering evaluation.

The self-contained units, sealed against moisture and corrosion, consist of silicon diodes enclosed in oil or askarel-filled ceramic

cylinders. Capacitors across each diode distribute voltage uniformly during high voltage transient surges.

Burger succeeds Yontz



*Ag-lime FINES
bring more money.*
**EAGLE
CAGE
MILLS**
**produce
more fines.**

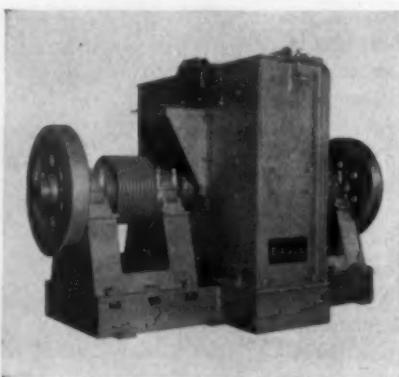
Yes, you can make more money if you are in a position to produce fine grades of ag-lime. Farming today is a science and the scientists have discovered that the farmer can make more money with the use of finer ag-lime . . . simply because it is absorbed faster.

Fine particle reduction of hundreds of materials is handled with ease by the distinguished line of multi-cage disintegrating mills as engineered and made by Eagle Crusher Company.

Eagle Cage Mills are sold all over the world because they are real money makers, require very low maintenance, have big capacity (10 to 70 tons), have one-piece, electrically welded frame, high quality taper-bore bearings . . . and they have easy access to working parts.



Coarse grades of ag-lime take longer to reach the plant's feeder root zone and are less desirable. Fine grades of ag-lime bring almost twice the market price and are in great demand.



A single pass four-row cage mill by Eagle Crusher Company with its high-speed impact, and disintegrating action using hard-faced bars produces finer aggregate . . . and increases tonnage! This single pass Eagle design produces superior quality ag-lime at an average rate of 30 tons per hour, subject to variations in raw materials and weather conditions.

Write today for free booklet titled:
Make More Money with Eagle Disintegrating Mills.



EAGLE
CRUSHER CO., Inc. GALION OHIO-U.S.A.

JAW AND ROLL CRUSHERS, PORTABLE PLANTS,
CRUSH AND HAMMER MILLS, CONVEYORS, LOADERS

Enter 1065 on Reader Card

150

ROCK PRODUCTS, August, 1961

Lewis J. Burger (photo) has been named president of LeTourneau-Westinghouse Co., Peoria, Ill., succeeding Merle R. Yontz. Mr. Burger was graduated from Purdue University in 1935 and was formerly associated with General Electric Co. Mr. Yontz resigned the presidency of LeTourneau-Westinghouse which he has headed since it was formed in 1953. He has accepted a position with Caterpillar Tractor Co.

350-bbl. per hr. air separator

An 18-ft. Sturtevant air separator at Huron Portland Cement Co.'s, Alpena, Mich., cement plant, is turning out over 350 bbl. per hr. of 88 percent, 325-mesh cement fines. The unit, largest in its maker's line, is powered by a 250-hp. motor. Raw clinker for the unit is first crushed in a two-compartment, 2,750-hp., 12 x 36-ft. mill. The separator also can use a 300-hp. motor.

Pilot plant for Jeffrey Co.

Jeffrey Mfg. Co., Columbus, Ohio, has authorized construction of a pilot plant near Anderson, S.C., to build screw and belt conveyors. The shift of a part of operations was reportedly due to tax, land value, geographic locations and competitive considerations. The new facility will contain about 80,000 sq. ft. of floor area, with a large share of it used for storage purposes.

W. S. Tyler appoints

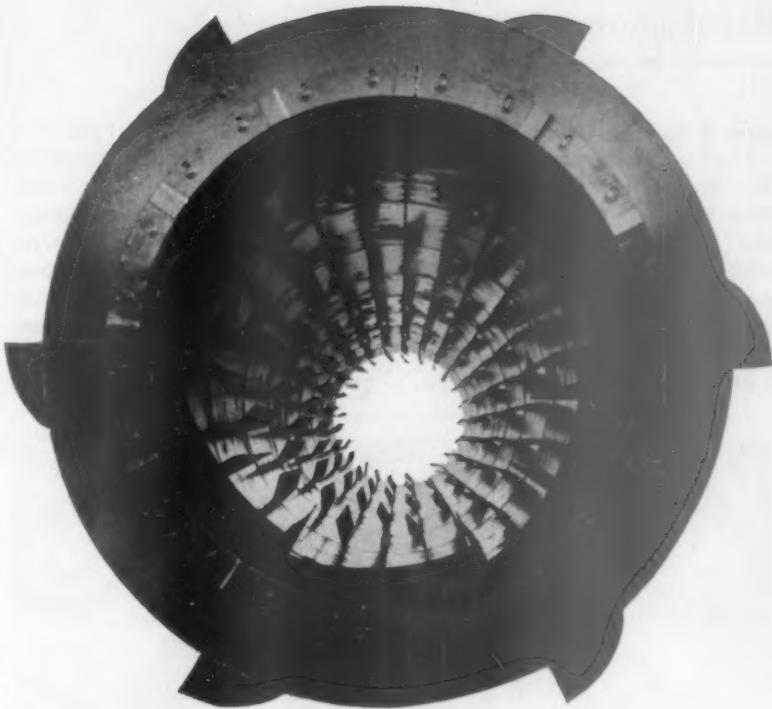
Appointments of James B. Carpenter as manager international sales of both The W. S. Tyler Co. and the W. S. Tyler International Co., and of Russell Robinson as assistant export manager have been announced by Albert E. Reed, vice president-marketing. W. S. Tyler, Cleveland, Ohio, is a producer of industrial woven wire cloth, and manufacturer of testing sieve equipment and various screening machinery.

FWD acquires Wagner

FWD Corp., Clintonville, Wis., has completed the purchase of all of the capital stock of Wagner Tractor, Inc., Portland, Ore., for an undisclosed amount. The announcement was made by Maurice E. Ash, FWD president. Wagner will be operated as an FWD wholly owned subsidiary under the direction of Mr. Ash.

Incorporated in 1954, Wagner produces heavy-duty, rubber-tired tractors ranging in size from 130 to 700 hp. FWD Corp. is a manufacturer of all-wheel-drive vehicles. In addition to the newly acquired Portland firm, FWD owns and operates FWD Corp. (Canada) Ltd., Kitchener, Ontario, and maintains a factory branch in Duncan, Okla.

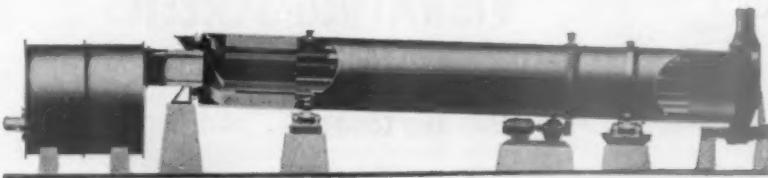
Please turn to page 152



ADAPTABILITY

with Ruggles-Coles® "XH" Dryers

The Ruggles-Coles "XH" Dryer is adaptable to the handling of any material that can be dried in rotary equipment. For example, Hardinge offers three types of feeders, one of which is best suited to the material being processed. Write for Bulletin 16-E-2.



HARDINGE

COMPANY, INCORPORATED

Main Office and Works • 240 Arch St., York, Pa.

"Hardinge Equipment—Built Better to Last Longer."

NEW YORK
TORONTO
CHICAGO
HIBBING
SALT LAKE CITY
SAN FRANCISCO
HOUSTON
LAKELAND
BIRMINGHAM

Enter 1066 on Reader Card

Manufacturers News

continued from page 151

Louis Allis buys Dynapar

The Louis Allis Co., Milwaukee, Wis., has announced the purchase of the Dynapar Corp., Skokie, Ill. Dynapar, founded in 1952, manufactures custom electronic equipment. John W. Allis, president of Louis Allis commented, "This acquisition is the first step in our long range pro-

gram of expansion and diversification. It is of particular significance because it marks our entry into the fields of electronic equipment used so extensively in industrial . . . applications." James E. Everett, founder and president of Dynapar, will be manager of sales and engineering for the Dynapar Corp.



Brugger transferred

E. A. Brugger, president and general manager of the Koehring Div., Koehring Co., Milwaukee, Wis., has accepted a new assignment abroad in connection with the company's European and overseas activities. He will locate in Paris, France. Appointed a vice president in Koehring's corporate management in 1948, Mr. Brugger has served on the company's board of directors since 1950 and will continue as a director. He has been president and general manager of the Koehring Div. since 1956. Mr. Brugger joined Koehring in 1916 in its engineering department.



These two 10'x60" double-deck KOLMAN Screens operating in tandem are key units in a portable aggregate plant making specification materials for highway construction.

Step up Screening Profits with **KOLMAN**

VIBRATING SCREENS

MAXIMUM CAPACITY

High speed operation delivers effective screening power and produces clear, accurate separations.

LIGHT AND COMPACT

Packs terrific screening capacity into a minimum of space without excess weight.

RUGGED CONSTRUCTION

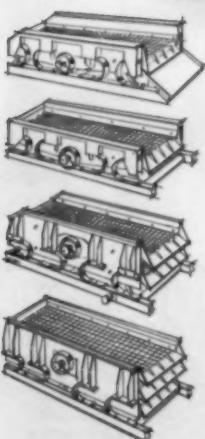
Proved to take the abuse dished out by the toughest jobs.

FLOATING ACTION

Unique spring suspension system gives the freedom of movement required for added capacity without transmitting vibrations to the frame.

WRITE FOR BULLETIN 140

KOLMAN MANUFACTURING CO.
4200 West Twelfth Street SIOUX FALLS, S. DAK.



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1961 CIMA officers

At the Construction Industry Manufacturers Assoc. (CIMA) Board of Directors Meeting held in Atlantic City, the following new officers were elected: President, A. J. Lichtenberger (The Wellman Eng. Co.); 1st Vice President, B. M. Wallis (Schield Bantam Co.); 2nd Vice President, R. E. Hunter (Detroit Diesel Engine Div., G.M.); Treasurer, R. McLean (The Jaeger Machine Co.) and Secretary, R. P. McKenrick (Executive Director, CIMA).

The CIMA is the only manufacturers organization whose entire efforts are devoted to the interests of construction.

Federal control of air pollution?

In a 20-page brief, the John Wood Co., Florham Park, N.J., points out that Federal control is unrealistic; that control logically belongs, and should remain, at the local level. It also stresses that a workable partnership between the government and industry is both feasible and desirable, and would effectively support local control authority. It opposes the Federal control trend, suggests various solutions for this national problem, and makes a sound case for maintaining control at local level.

Huge grinding mill motor

Four of the largest synchronous mill motors in the rock products industry have been produced by Allis-Chalmers Mfg. Co., Milwaukee, Wis. These 3,000-hp., 4,000-v., 200-rpm. mill motors will be used to drive 12 x 36-ft. mills at a new Florida cement plant installation. The motors use super duty insulation to withstand high temperatures, shock, vibration and dusts.

A-C scholarships awarded

Six local boys and girls are among high school seniors who have been awarded \$600 college scholarships by the Allis-Chalmers Mfg. Co., Milwaukee, Wis., it was announced by R. S. Stevenson, president. The scholarships are given annually to sons and daughters of Allis-Chalmers employees. They can be renewed annually.

Proposed merger— Atlas and Stuart

Atlas Powder Co.'s, Wilmington, Del., shareholders have been asked to consider a proposal to adopt an agreement of merger providing for merging the Stu-

art Co., a West Coast ethical pharmaceuticals firm, into Atlas. The agreement also provides for changing the name of Atlas to Atlas Chemical Industries, Inc. Atlas President, Ralph K. Gottshall, commenting on the proposed new name, said that it would "more accurately characterize the growing diversification

of our business." Atlas Powder Co. was incorporated in 1912 as a manufacturer of black powder and other explosives. The Stuart Co. was organized in 1941. If the merger is effected, Stuart will be operated as a division of Atlas. The merger involves a split of common stock.

END

PERFORMANCE-PROVED DESIGN for CONTINUOUS PEAK DELIVERY

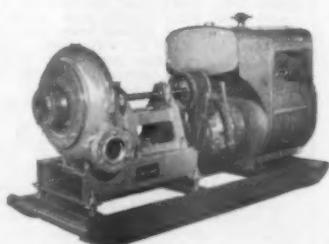
 **lightning**
SAND AND GRAVEL PUMPS



Model MA 6" & 8"

Compact Design...Rugged Construction

LIGHTNING Model MA handles large quantities of sand and gravel economically, up to a total head of 100'. Simple design makes it easy to maintain close internal clearances. Rugged construction withstands the shock of large solids passing through. Large, clean passages insure maximum and continuous delivery.



Available Mounted on Skid Base Complete with Gasoline Engine

Close coupled with V-belt drive. Either pump or industrial gasoline engine may be removed from the structural steel base for separate use. Model MA pump is light in weight and compact, for easy handling.

"Sixty years of service to the sand and gravel industry." We offer a complete line of pumps including rubber-lined and new ceramic-lined models. Write for complete information.

The KANSAS CITY HAY PRESS COMPANY

801 Woodswether Road • Kansas City 5, Missouri

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You may find just what you're looking for in the used equipment, employment and professional advertisements below. Box numbers are confidential and advertisers' names will not be disclosed. Send replies to: Box Number (shown on ad), c/o ROCK PRODUCTS, 79 W. Monroe St., Chicago 3, Ill. All replies will be forwarded to advertisers daily.

CONCRETE PLANTS

Johnson 150 ton 3 comp. aggr. cement 1500
Noble CA-104-100 4 comp. 800 CF cement silo
Johnson TY 100-200 yd. bins 4 aggr. 1 cement.
Koenig mixer. 8 yd. batcher.

Erie Shredder 150 tons aggr. bin, 880 bbls. cement
Noble CA-254 4 comp. large capacity. Complete
Smith 84-8 3 yd. Tilt-Mixer, 40 HP AC motor.
Johnson 305, TYI-58, 200 yds.; 3 comp. aggr. 300 bbls.

FULLER KINYON CEMENT EQUIPMENT
1—7" conveyor system pump Type HS-7 Elec.
motor.
1-Type C200 single stage rotary compressor 125
HP. Elec.
1-6" motor operated 2-way directing valve
1-8" Fuller Huron aisleide conveyor system. Complete.

MILLS—CRUSHERS—KILNS—DRYERS
JAW: Bellanca, 14x24, Buchanan 18x36, 36x42,
Type C 30x42, Cedar Rapids 28x36, Traylor 28x36,
36x48, 36x72, Lippman 24x32; Universal 36x42;
Superior McCully 42x40;
GYRATORY: Al. Chal. 5K, 10", 18, Gates 12K;
Traylor 12K; Koemel Van Saen 37";
COME: Hydrom 3", 4", 5", 6", Kue-Ken 30";
Traylor TY4; Telsmith 3", 5", 6", 8";
ROLL: Cedar Rapids 24x16, 35x30; Al. Chal.
37x16, 42x16, Pioneer 40x22, 46x26 triple 54x24;
Tenneco 30x22; Universal 30x18; Lippman 40x20;
MILL: R-R 40x22; Denver 42x, 42x16, Hardinge 40x16;
Marcy 3x8, 5x12;
TUBE: Al. Chal. 6x22, Smidt 54x20, 6" x 21";
Hardinge 4" x 16", 8x18"; 8x36; 8x48; 10x48;
HAMMERMILLS: Penn SXT-350 HP motor. 6X8
10" x 12"; Stedman 24x39, 36x42; Cedar Rapids
50x42, 56x48, 56x54; Telsmith 36x50;
AUTOCLAVES: JAC 6" x 25"; 8" dia. x 128";
KILNS: 6"x20", 6"x120", 8"x100", 8x124";
BALL MILLS: 4" x 16", 8"x28", 8" x 48";

CRUSHING PLANTS
Pioneer Port. 2436 jaw 4022 twin roll 36" x 30" apron
feeder. Murphy Roll port. Diesel. New 1958.
C-R 2236 jaw. Port. double deck grizzly. Diesel
heavy duty feeder.
Diamond Port. 2636 jaw. Heavy tandem.
Aus. West. 25x40 Prime Crusher, 160 HP Elec.
motor. Concrete.
C-R 36" x 45" double Impeller Breaker, feeder.
Universal 3042 jaw. 4024 roll Diesel Port.

DREDGES

Peker 6" x 8" port. hull 8' x 24" x 33" Diesel.
Morris 6" x 10" hull 14' x 30" Diesel.
Markham 12" x 10" cutterhead Cat. 337 main power
Markham 12" x 10" cutterhead Cummins 660 Diesel
Ameco 14" suction 12" discharge heavy duty Type
357 Turbo charged Cat. engine.

RICHARD P. WALSH CO.

30 Church St.
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Cable: RICHWALSH

JAW CRUSHERS

60"x48" to 6"x3"
New and used RELIABLE



"Farrel-Bacon"
Jaw Crushers

BACON-PIETSCH CO., INC.
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Phone Montclair—Pi 1-3100

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ALL SECTIONS

ALL ACCESSORIES

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ROT. DRYERS—KILNS

10' x 11' x 175' Vulcan Kiln, 11";
10' x 78' National dryers, 1/4";
8'-8" x 70' Hardinge 1/2" welded.
8' x 80' Traylor dryer, 1/4" welded.
8' x 60' rotary kiln, 1/2" welded.
8' x 40' Stearns-Roger dryers, 1/2"
7'-6" x 62' kiln, 1/2" welded.
7' x 110' Bonnot kilns, 1/2" shell.
6' x 7' x 100' kiln, 1/2" shell.
6' x 50' Louisville steam-tube
6' x 50' rot. dryer, 1/2".
6' x 40' rot. cooler, 1/2".
6' x 25' Louisville steam-tube
4'-9" x 32' dryers, 1/2" shell.
4'-6" x 40' Ruggles-Coles dryer
3' x 23' Standard dryer, 1/2"

JUST PURCHASED

1—2' Symons shorthead cone
1—5' x 10' ball mill, 75 HP.
1—Raymond 66" hi-side mill

PERRY

DRAG SCRAPER UNIT: Souerman Drag Scraper Unit complete, 2 yd. capacity, Crescent bucket, 75 H.P., 440 volt motor and all auxiliary equipment. Condition like new.

CLASSIFIER: Akins 78" x 26" with motors and drive. New 1959.

SCREEN: Allis-Chalmers 4' x 12', horizontal, 3-deck, with motor.

LOG WASHER: 8" x 25' with new paddles, 50 H.P. motor. Excellent condition.

CRUSHERS, JAW: Allis-Chalmers 40 x 42" with 150 H.P. V-belt drive motor and controls, with or without heavy duty Apron Feeder 42" x 14'3" with motor, reducer and drive, condition guaranteed. Buchanan 36 x 42" with motor and drive. Other crushers 8" x 10" to 48" x 60".

CRUSHER, GYRATORY: Telsmith 16-8 with motor and drive.

CRUSHERS, ROLL: One Sturtevant 16" dia., 4" face. One Pioneer 24" x 54" roller bearing type with 125 H.P. motor, 220/440 volt.

PULVERIZERS: One Rod Mill 6 x 8 complete with motor and drive. One Ball Mill 9 1/2" x 11 ft. with motor and drive. Both new 1958.

FEEDERS: Jeffrey Vibrator type 4DL, size 18" x 10 ft. with controls, new condition.

BUCKETS: Williams 1 1/4 yd. clam shell, material handling. Blow Knox 3 yd. and 3 1/2 yd. capacity.

HOIST & DERRICK: American 115' mast, 100' boom, 30 ton capacity @ 100 ft. complete, new 1957, with or without American hoist, new 1957.

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PERRY FOR KILNS - DRYERS - MILLS

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Hardinge 8' x 48" conical pebble, 75 HP
Hardinge 7' x 36" conical pebble
Allis-Chalmers 6' x 18' pebble-tube
Allis-Chalmers 6' x 16' ball-tube
Allis-Chalmers 5' x 22' ball-tube
Bonnot 5' x 10', 75 H.P.
Allis-Chalmers 5' x 5' ball, 75 HP
Denver 4' x 10' rod mill, 60 HP.

CRUSHERS—PULVERIZERS

Symons 2' shorthead cone crusher
Allis-Ch. #322 hydracone crusher.
Farrel 36" x 15" jaw crusher
Buchanan 24" x 13" jaw, 50 HP
Mitchell 18" x 9" jaw, 25 HP
Babcock & Wilcox #32E ball type pulv.
Raymond 66" 6-roller mill, 200 HP
Raymond 50", 5-roller, hi-side mill
Dixie #5060 hammermill, 500 HP

EQUIPMENT CORP.
1418 N. Sixth—Phila. Pa.
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FOR SALE

CRUSHERS

Penna. CF-38 Reversible Impactor
Stedman 36" Single Cage Mill
Telsmith 36" Standard Gyrosphere
Farrell-New Ecc. Shaft for 42" Jaw

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Michigan TMCT-16 Truck Cranes 25' Boom
Lorain 75 Stick & Bucket 1 1/4 Yd
Northwest Hoist Drum Laggings 1" for
80D
Hoist ABIXE 2 Yd Clam Shell

SCREENS

Allis-Chalmers 5 x 12 Low Head Single Deck with Step Deck Pockets
Telsmith 3 x 10 Triple Deck
Rotex Sifter 5 x 7 Single Deck

MISCELLANEOUS

Car Pullers 5 & 7 1/2 HP
Hoffman Vacuum Cleaners 7 1/2 & 10
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Chambers Pug Mill 28" x 14'
Hughes Double Drop Deck Semi-Trailer

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25 Sleeve Bearing Squirrel Cage 440/
360 3 HP to 75 HP

G. & W. H. CORSON, INC.
Plymouth Meeting, Pa.



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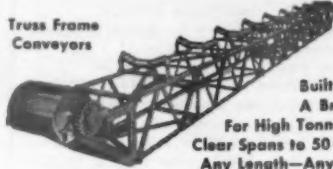
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CURRENT MODELS—IMMEDIATE SHIPMENT FROM OUR FACTORY—WRITE, WIRE OR PHONE FOR FREE CATALOG AND PRICES

BONDED® TROUGHING IDLER CONVEYOR BARGAINS



8'' JR. I-BEAM CONVEYORS



Truss Frame
Conveyors

Built Like
A Bridge
For High Tonnes
Clear Spans to 50 Ft.—
Any Length—Any Belt
Width

Bonded Pre-Fab conveyors are designed to give you fast, efficient and economical movement of your bulk materials at low cost, with a minimum of maintenance. Sand, Gravel, Crushed Stone, Chemicals, Fertilizer and Coal are just a few of the materials that can be transported on these conveyors.

Three different designs offer a wide choice to fit the particular application and budget. All are *site built* for quick, easy installation.

BONDED 8'' JR. I-BEAM CONVEYOR. A low cost unit for moderate speeds and capacities. Ideal for low headroom installations above or below ground.

BONDED TRUSS FRAME CONVEYORS. Available in 18" and 30" deep frame. Built like a bridge. For heavy loads, higher speeds and capacities, clear spans to 50 feet. This will vary with depth of truss, accessories required, etc.

We take our loss on our stock of short length belting. Prices below save you as much as 50% on **BONDED CONVEYORS** with conveyor belting in two pieces. Belt in new stock, guaranteed to meet listed specifications.

A full line of accessories is always available, including carrying and return belt covers.

REMEMBER. You Save Up To 50%—Conveyor Prices Include Belting.

8" JR. I BEAM FRAME CONVEYOR

Belt Width	Conveyor Length	Price	Add or Deduct	Add or Deduct
			Per Foot	
14"	25'	\$ 766	\$16.62	
16"	25'	786	17.10	
18"	25'	830	18.03	
20"	25'	871	19.20	
24"	25'	922	20.68	
30"	25'	1012	23.17	
36"	25'	1165	25.91	

WRITE FOR BULLETIN #1138

TRUSS FRAME CONVEYOR

18" TRUSS	30" TRUSS	Top and U. S. Made	
		Ply	Bottom Covers Per Foot
\$ 901	\$ 965	3	1/8" x 1/8" \$2.31
923	9789	2	1/8" x 1/8" 2.88
559	102.42	4	1/8" x 1/8" 3.06
298	109.45	1044	117.20
1067	116.24	1201	128.66
1140	129.37	1297	144.18
		1398	157.64

WRITE FOR BULLETIN #1189

BONDED® SPECIAL SERVICE AND HEAVY DUTY VIBRATING SCREENS



TYPE C

- ✓ LOW PRICES
- ✓ HIGH CAPACITIES
- ✓ FACTORY TESTED & BALANCED
- ✓ CONTROLLED VIBRATION
- ✓ SHARP, CLEAN SEPARATION
- ✓ CONTINUOUS OPERATION
- ✓ REVERSIBLE SCREEN CLOTH
- FOR LONGER LIFE

SPECIAL SERVICE SCREEN, Type C. Series 2 with opening in top deck up to 2" for scalping, etc. Series 1 for fine screening and dedusting. Ideal for portable or temporary installations. 2' x 4' to 8' x 8'. 1 to 3 decks. WRITE FOR BULLETIN #1224.



HEAVY DUTY MODELS, Type TB; two bearing, positive throw, eccentric shaft screens, suspension mounting. 3' x 6' to 4' x 14', 1 to 5 decks. Prices for base mounting and 4-bearing screens on request. WRITE FOR BULLETTINS #1087 and #1279.

MODEL NUMBER	SCREENING AREA	NUMBER OF DECKS	PRICE	U. S. Imported	
				Ply	Per Foot
124C	2' x 4'	1	\$ 487	4	\$3.31
224C	2' x 4'	2	519	4	3.74
324C	2' x 4'	3	516	4	4.14
126C	2' x 6'	1	519	4	4.72
226C	2' x 6'	2	531	4	5.35
326C	2' x 6'	3	566	4	6.56
136C	3' x 6'	1	639	4	7.95
236C	3' x 6'	2	757	5	6.25
336C	3' x 6'	3	1052		
138C	3' x 8'	1	743		
238C	3' x 8'	2	897		
338C	3' x 8'	3	1896		
136TB	3' x 6'	1	1243		
236TB	3' x 6'	2	1316		
336TB	3' x 6'	3	1393		
138TB	3' x 8'	1	1299		
238TB	3' x 8'	2	1392		
338TB	3' x 8'	3	1429		
2410TB	4' x 10'	2	2112		
3410TB	4' x 10'	3	2244		
2412TB	4' x 12'	2	2279		
3412TB	4' x 12'	3	2614		

Other sizes available. Prices quoted on request.

TESTED CONVEYOR BELTING

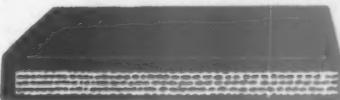
WE PAY FREIGHT ON 200 POUNDS AND OVER.

QUANTITY DISCOUNTS ON 150' AND OVER

Guaranteed to meet listed specifications. Tested by the Engineering Laboratory of one of the largest universities in the U. S.

Other widths, plies, duck weights and cover thickness available at low prices.

WRITE FOR FREE SAMPLE & BULL. #1279



MAJOR BRAND: 12# to 15# Friction Pull. 800# to 1000# Cover tensile. Heavy duty. 28 oz. Cotton Nylon Duck. Used in moving boxes, bags, coal, sand, gravel, crushed stone, refined sugar, salt, coke, earth and materials when abrasion is not too severe.

MAJOR BEE BRAND: 16# to 19# Friction Pull. 2400# to 3000# Cover tensile. Heavy Duty. 28 oz. Duck. Domestic Belt has Cotton Nylon Duck. Imported Belt has Cotton Duck. 1/2" top rubber cover x 1/8" bottom rubber cover. For more severe service, high tonnages and abrasion resistance. For hauling stone, mineral ore, concrete, cement, coal and other similar materials, both wet and dry.

Width	Ply	U. S. Imported	
		Per Foot	Per Foot
12"	4	\$3.31	\$3.17
16"	4	3.74	3.56
18"	4	4.14	3.73
20"	4	4.72	4.32
24"	4	5.35	4.86
30"	4	6.56	5.38
36"	4	7.95	6.88
24"	5	6.25	5.63

THE FOLLOWING HAVE 1/2" TOP RUBBER COVER X 1/8" BOTTOM RUBBER COVER.

12"	3	\$2.41
16"	3	3.23
24"	3	4.24

BONDED® IDLERS & RETURN ROLLS



3-roll, 5" diameter Troughing Idlers for:

14" belt	\$19.75	24" belt	\$22.75
16" belt	20.50	30" belt	23.85
18" belt	21.00	36" belt	24.90
20" belt	22.10	48" belt	27.50

1-roll, 5" diameter Return Rolls for:

14" belt	\$ 8.50	24" belt	\$11.00
16" belt	9.00	30" belt	12.50
18" belt	9.50	36" belt	12.75
20" belt	10.00	48" belt	16.50

All steel. Interchangeable with other well-known makes. Furnished with replaceable pre-lubricated sealed ball bearings. Maintenance is negligible. WRITE FOR BULLETIN #1188.

BONDED SCALE AND MACHINE COMPANY

PHONE Days: Hickory 4-2186

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128 Bellevue

Mfrs. of Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers, Feeders and Bucket Elevators COLUMBUS 7, OHIO

WHERE TO BUY

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ROCK PRODUCTS EQPT. DIV.

8' x 60' x 1/2" Welded Rotary Kiln
6' x 120' x 1/2" Vulcan Rotary Kiln
4' x 35' Rotary Dryer New Shell
4' x 47' x 1/2" Moosier Rotary Dryer
6' x 25'; 6' x 50' Louisville Rotary Dryers
8'8" x 70' Ruggles Cole Dryer
8' x 11' Traylor Ball Mill Steel Lined
7' x 24' Allis-Chalmers Tube Mill
#5060 Dixie Mogul Hammermill
SX13 Penna. Hammermills, 400 HP
Heil Patterson Crushers, 100 HP
Raymond #50 & #40 Impact Mills
36" x 42" Koppen 2 Roll Crushers
36" x 48", 20" x 6" Jaw Crushers
3'x3'x12' Horiz.; 4'x9'x12' Vert. Puggers
27" x 24" Komarek-Greaves Brig. Presses
20"x40"-30"x96"-40"x84"-60"x84" Screens
535"-24" Troughing Belt Conveyor
Bucket Elevators 45° to 90° Centers
Sweco Separator 48" 3-55 Screens

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MU 7-5280

PRICED FOR QUICK DISPOSAL

- 3 Allis Chalmers (2 compartment) 7'x22' Compab Mills with Meehanite liners; each directly coupled to 400 H.P. Motor.
- 1 Allis Chalmers 9'6" Continuous Ball Mill; or PRELIMINATOR with Meehanite liner; directly coupled to 400 H.P. Motor.
- 3 Allis Chalmers 7'x22' Continuous Tube Mills; with three 14' Raymond Double Whizzer Air Classifiers; each mill directly coupled to a 400 H.P. 3/60/2200 V 180 RPM Motor.
- 3 Raymond 14' Mechanical Air Separators with Double Whizzers, new in 1950. Each Separator V-Belted to a 75 H.P. Motor.

All Mills and Classifiers were operated in CLOSED CIRCUIT.

Also available are Steel Enclosed Bucket Elevators and Screw Conveyors.

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WRITE-WIRE or PHONE COLLECT
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MODERN EQUIPMENT FOR SALE

15 H.P. Motor-Reducer Conveyor Drives.
50 H.P. Gearmotors 100 R.P.M.
2 to 10 H.P. Gear motors.
Reducers up to 250 H.P.
Carpullers—3, 5 & 7½ H.P.
24" to 36" Used Belt.
14" to 48" Used Idlers.
Sturtevant #1 & 1½ Rotary Crushers.
Champion #5 Jaw Crusher 12 x 26.
Cedar Rapids Jaw Crusher 9 x 24.
New England Jaw Crusher 14 x 28.
Good Roads Jaw Crusher 10 x 30 R.B.
Good Roads Jaw Crusher 5 x 12.
Acme Jaw Crusher 14 x 26 Steel Frame.
Denver Lab. Jaw Crusher 3½" x 4½".
Farrel Jaw Crusher 36 x 18.
Farrel Jaw Crusher 24 x 13B.
Farrel Lab. Jaw Crusher 6" x 2".
New Holland Plate Feeder 24" x 60".
Jeffrey-Traylor #4 Vibrating Feeder with Controller.
9" Screw Conveyor Complete with Ends, Hangers, Gearmotors (250' avail.)
Robins Vibrex Screen 4' x 6'.
Niagara Single Deck Screen 4' x 14'.

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ELEC. AIR COMPRESSORS
695" Chgo. Pneu YCB-100 HP 220/440 V.
6" Inger Rand 1350, 2200, 3000 & 3800'
DIESEL LOCOMOTIVES, CRANES & CARS
18'-115', 100, 80, 70, 65, 45, 25, 20, 10 & 8 ton GE & GM & Plymouth Diesel Locomotives
500-50 & 70 ton Gondola & Box Cars
500-50 ton Amer. Diesel Loco Crane
40-20 & 30 yd Air Dump Cars
ROTARY DRYERS & KILNS
6" x 48", 6" x 72", 8" x 50", 9" x 160", 10" x 78"
7" x 110" Rotary Kilns
REDUCTION MILLS & FEEDERS, CRUSHERS
18V-Pioneer Portable Diesel Crusher
40 x 33 Cedar Rapids Hammermill
2020 & 3645 Double Impact Breakers
15 x 24 Cedar Rapids Port. Crusher
3" x 12", 4" x 8, 4" x 12 & 6" x 16 Vib. Screens
2", 3", 4", 5½", 6" & 7" Symons Cones
5" x 5", 6" x 4" CIW Ball Mill w/motor
5" x 10", 6" x 12" & 7" x 15" Rod Mills
2-KVS 5" x 8" Ball Tube Mills Air Swept
536 Amer. Ch. Hydrocone Crusher
4" 0" Traylor "spe 17" Gyrotary
10" x 30", 18" x 36", 13" x 24" Jaw Crushers.
48", 20", 20" Traylor Primary Gyrotary Crushers
2-20" Allis-Chalmers S.M.C. Gyrotary Crs.
8" x 10", 6" x 20" x 36" Pioneer Jaw Crushers
2A Cedar Rapids Port. 24 x 16 Roll Crusher
14x28, 12"-26", & 9"-24" Cedar. Rapids Jaw
18x36, 30"-42", 48"-60", & 66"-84" Jaw
Crushers
46" Stedman Double Cage Disintegrator
24" x 14" Allis Chalmers Style B Double Roll
Bradley Hercules Mills (3) Type 6000
F55 Syntron Grizzly Feeder
6"-30", 32" Ding's Magnetic Head Pulleys
3-200 HP & 160 HPSD. Ottumwa Elec. Hoists.
ELEC. WHIRLEY CRANES
2 Amer. R20-60 Gentry 139' Boom
WANT KILNS—DRYERS—CRUSHERS
R. C. STANHOPE, INC.
80 E. 42nd St., N.Y. 17, N.Y.
TEL. MU 2-3076 & 2-1899

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4500 Manitowac Dragline 4 yd. 140' 386 Cat. Diesel
(3) 1007 Osgood Marion Dragline, 2½ yd. Marion Crawler Dragline, 2 yd. 80' Lorain Dragline, ¾ yd. clam bucket General Shovel, ¾ yd. diesel engine General Marion Shovel ¾ yd., 371 G.M. Diesel
15438 Northwest Shovel ¾ yd., Buda gas engine

CRUSHING EQUIPMENT

New Holland 5050 Double Impeller Crusher
Pioneer 2436 Jaw Crusher
Cedarapids 2020 Double Impeller Crusher
Eagle 24" Hammermill
Universal 4136 Hammermill
Cedarapids 1524 portable primary jaw Crusher
Universal #5 Hammermill
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NOTES FROM THE PUBLISHER

August, 1961

Dear Reader:

Within the last several years, subscriptions to ROCK PRODUCTS from behind the Iron Curtain have been mounting at far too rapid a pace.

Apparently, we are supplying "know-how" to those readers that we must assume is helping them in their economic growth.

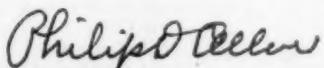
Not being one to want to aid and abet those of different political philosophies, we have just cancelled all subscriptions going behind this "Iron Curtain." We realize that they will probably get copies of ROCK PRODUCTS through other channels, but we're not about to make it easy for them.

In no way are we going to help our "sworn enemy."

Apparently, the Reds like what we do editorially, realizing that ROCK PRODUCTS is the one magazine that tells the producer of nonmetallic minerals and cement how better to run plants, for they keep writing for subscriptions and more information on topics about which we write. But—as stated, the several hundred subscriptions going to the Reds have immediately been cancelled.

We know that you, the reader, will sympathize with our attitude.

Sincerely,



Philip D. Allen
Publisher

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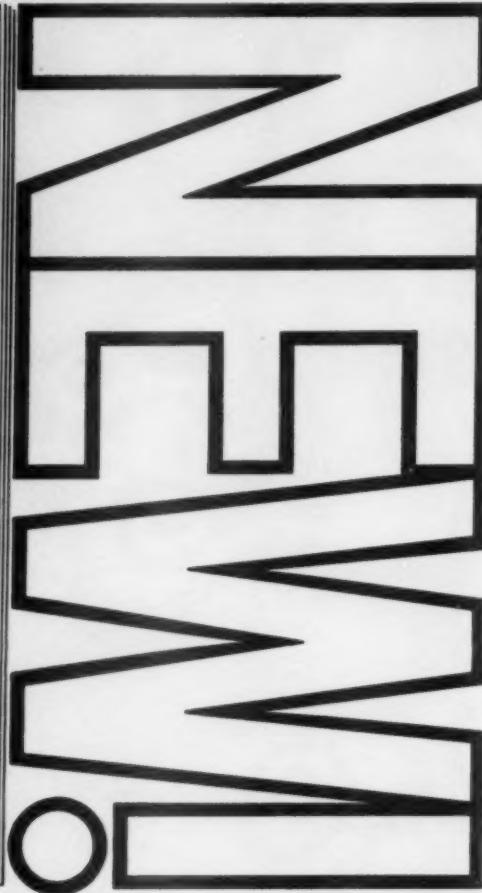
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